TECHNOLOGY DEPT.

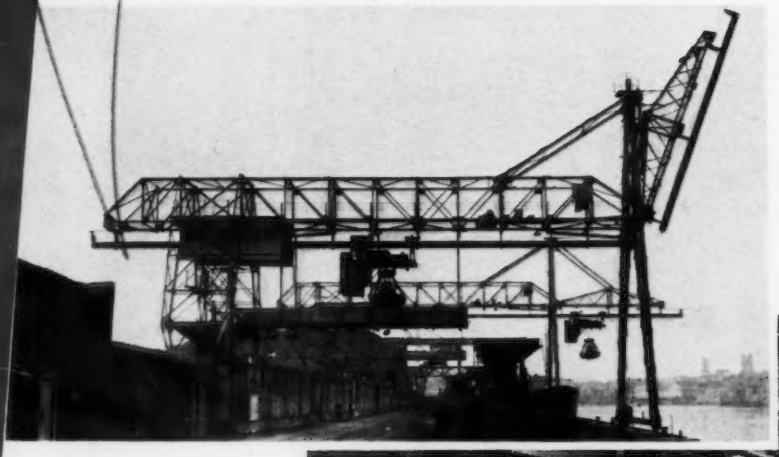
Gas Journal

VOL. 281. 107th YEAR. LONDON, MARCH 30, 1955. No. 4791. PRICE 1/3

APR 12 1955 DETROIT

MATERIALS HANDLING PLANT

for the Gas Industry



TRANSPORTERS—

for unloading coal ships and/or serving coal and coke stores.

SPECIAL EQUIPMENT

—such as the underslung Travelling Jib Crane shown working in a covered coal store.

STEELHOIST

ALSO WAGON TIPPLERS OF ALL TYPES - SKIP HOISTS - TELPHERS - CONVEYORS, ETC.

Designed, Manufactured and Erected by

STRACHAN & HENSHAW LTD

Steelhoist Works, Bristol. 2.

Tel : 77664.

FIG. 150

modern H.P. design

Double-faced Modern H.P. Design. Corrosion Resisting Steel Door. Special Resilient Non-Metallic Composition Seats. Self-Lubricated. Seats enclosed and protected from Dust and Dirt in both Open and Closed Positions. Simple and Robust in Construction. Positive in operation. No Internal Operating Mechanism exposed to Gas Stream. No Wedges or Springs. Cannot Jam—Open or Closed. Spindle can be Repacked in the Open or Closed Position. Standard Test Pressure 100 lbs. per Sq. In. Air. Internal or External Screw with or without Indicator. Can be Adapted for Under-Pressure Connections. A High Pressure Valve at a Low Pressure Price. Sizes 3" to 24" Horizontal and Vertical.

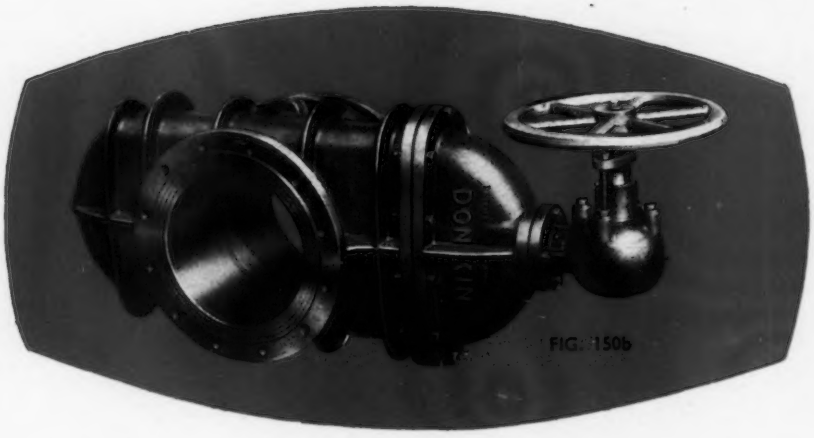


FIG. 150b

THE BRYAN DONKIN COMPANY LIMITED

THE DONKIN CL VALVE

CHESTERFIELD · (TEL : 3153) · LONDON

Makers of Gas Valves for over 100 Years

BRITISH VALVE MANUFACTURERS ASSOCIATION MVMA

THE SOCIETY OF BRITISH GAS INDUSTRIES · SOBGI ·

They serve many useful purposes!

TANKS

by DEMPSTERS of MANCHESTER

The hallmark of high quality plant

A GROUP OF OUR WELDED STEEL TANKS.
(Photograph by courtesy of THE ASSOCIATED ETHYL COMPANY LTD.).

We make stills and tanks of cast iron or steel; tanks with open or closed tops; with dished, coned, or flat ends; of cylindrical or rectangular form; of bolted, riveted, welded, or pressed construction; with trussed self supporting crowns; and for the storage of liquor, oil, spirit, tar, water, etc.

Your orders and enquiries will be welcomed by:

R. & J. DEMPSTER Ltd.

Constructional Gas and Chemical Engineers

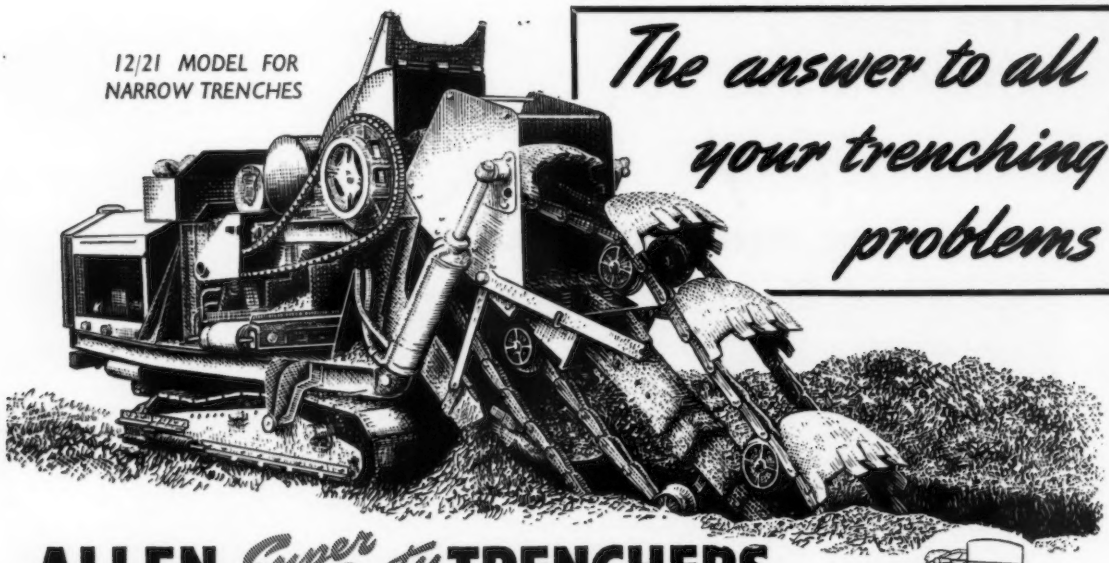
GAS PLANT WORKS · NEWTON HEATH
MANCHESTER · 10

London Office: 34, VICTORIA STREET, S.W.1

We make:—BY-PRODUCT and CHEMICAL PLANT · CONDENSERS · DETARRERS · GASHOLDERS · GAS VALVES and CONNECTIONS · IRON CASTINGS · PURIFIERS · STILLS · TANKS · WASHERS · WELDED and RIVETED STEELWORK

A

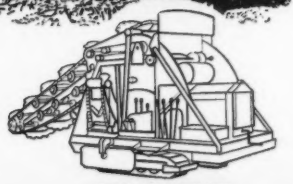
12/21 MODEL FOR NARROW TRENCHES



The answer to all your trenching problems

ALLEN *Super Duty* TRENCHERS

For narrow trenches we supply the 12/21 model, and for wide trenches the 16/60 model. Both models are a fine engineering job and capable of standing up to continuous hard work. We shall be pleased to send you further information and fully illustrated brochures on request.



16/60 TRENCHER

JOHN ALLEN & SONS (OXFORD) LTD. COWLEY OXFORD *Tel 77155/6/7*

CLAYTON SON & CO., LTD., HUNSLET, LEEDS

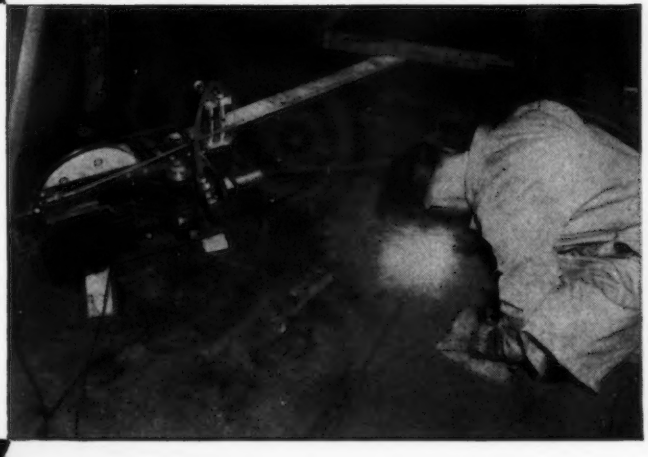
SPIRAL GUIDED GASHOLDER & STEEL TANK. 125' x 30' CAPACITY 1,000,000.

THE TORCH OF INDUSTRY

NOW 40 % FASTER WELDING OF MILD STEEL WITH ARGONAUT

Mild steel can now be welded far more speedily than ever before. The B.O.C. Argonaut process—already established as the speediest and most successful method of welding aluminium and stainless steel—has been developed to give the same proportionate increases in speed and efficiency in the welding of mild steel. Argonaut welds 40 per cent. faster, and, because there are no delays for electrode changing, this increased speed can be maintained throughout the whole welding operation.

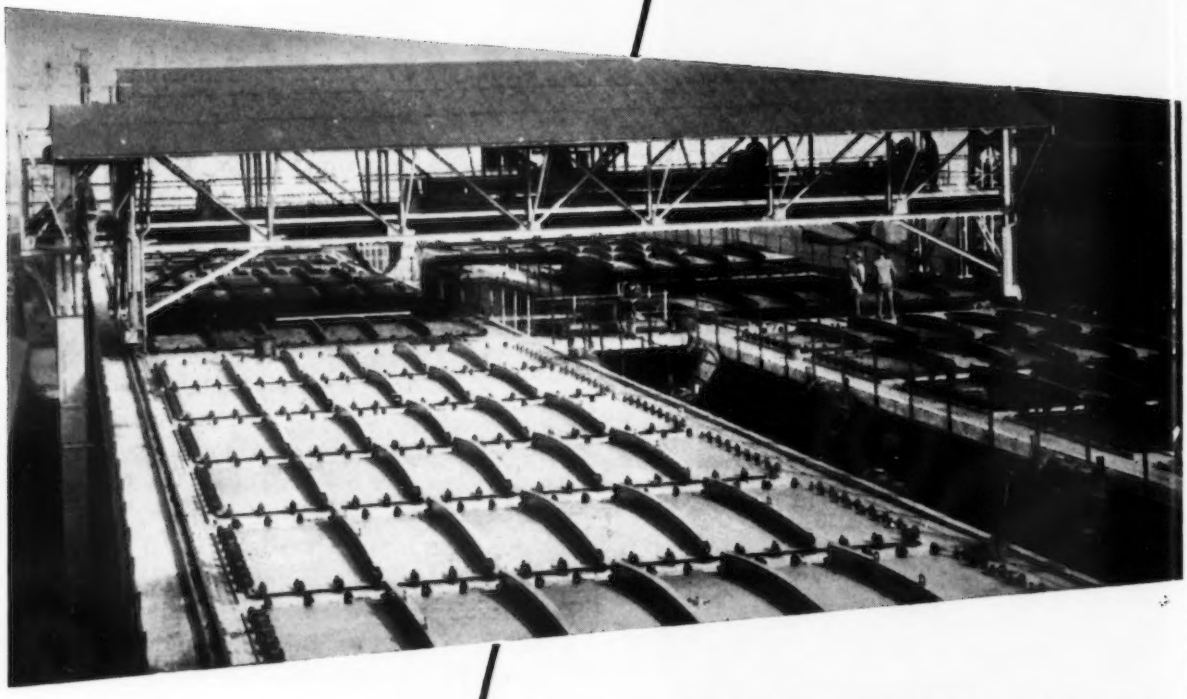
Here Argonaut is being used to weld a steel barge built by the Thames Steam Tug & Lighterage Co. Ltd. Butt welds on semi-killed boiler quality steel and fully-killed pressure vessel steel have been found to have a greater strength than the parent metal. For further details and full technical information write to your nearest B.O.C. Branch.



BRITISH OXYGEN COMPANY LIMITED

LONDON & BRANCHES

OXIDE HANDLING



THE MODERN WAY

SPECIAL FEATURES OF THIS PLANT:

ELEVATOR IN ALUMINIUM
GRAVITY-WEIGHTED CABLE REELING DRUM
ABRASIVE RUBBER COVERED BELT IDLERS
COVER OVER LOADING OPERATIONS
ANTI-CORROSIVE TREATMENT OF STRUCTURE

MECHANICAL HANDLING PLANT FOR THE COKE AND GAS INDUSTRIES

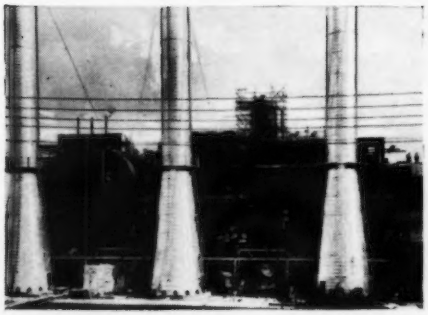
HUWOOD

Head Office and Factories
HUGH WOOD & CO., LTD. :: GATESHEAD-ON-TYNE, 11.
Telegrams: HUWOOD, GATESHEAD. Telephone: LOW FELL 76083 (5 lines)
Industrial and Export Office
DASHWOOD HOUSE, 69, OLD BROAD STREET, LONDON, E.C. 2.
Telegrams: HUWOOD AVE., LONDON. Telephone: LONdon WALL 6631-2-3

IND/FB/63

Use our experience if you have a foundation problem

FRANKIPILE

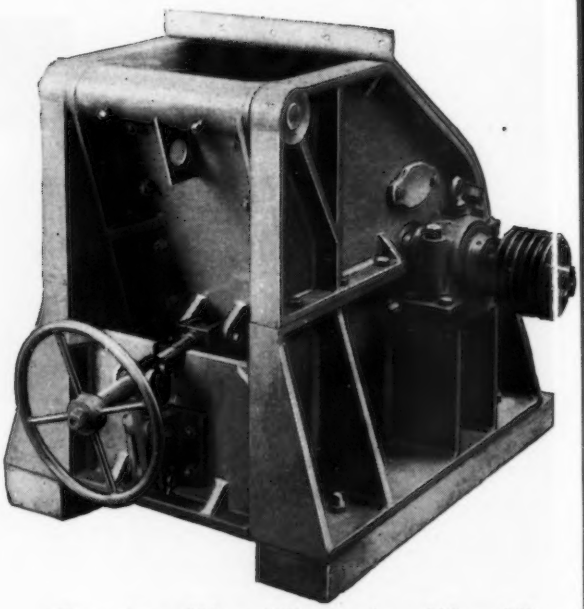


THE FRANKI COMPRESSED PILE CO. LTD. · 39 VICTORIA ST LONDON SW1 · CABLES · FRANKIPILE SOWEST LONDON

AND IN AUSTRALASIA · BRITISH WEST INDIES · IRAQ · RHODESIA · S. AFRICA

This **oxide crusher** *gives control of product-size, without using screen bars.*

FOLLOWING the introduction of the B.J.-D Oxide Crusher some short time ago it has now been thoroughly site tested. The results have proved entirely satisfactory. When operating without screen bars, the external handwheel on the B.J.-D Oxide Crusher gives control of product size by enabling the clearance between breaker plate and hammers to be varied as required. To permit passage of sticky material, the breaker plate can be swung wide open, thus eliminating by-pass chutes. A feature of the machine is that a minimum of flying dust is created during operation.



Two sizes—20" x 12" and 33" x 24"

Ask about BJD **oxide crushers**

BRITISH JEFFREY-DIAMOND LTD., CRUSHER DIVISION, 15/17, CAXTON ST., LONDON, S.W.1
bjd

E. C. & J. KEAY, LIMITED

CONSTRUCTIONAL ENGINEERS AND IRONFOUNDERS

Head Office:
"Runnymede,"
Stratford Road,
Henley-in-Arden,
Warwickshire

Also Offices at
LONDON
SOUTHAMPTON

Cast Iron Purifiers temporarily erected in our Works prior to despatch

Specialists in Tanks, Steel or Cast-Iron, Riveted or Welded, etc.

JAMES BRIDGE WORKS, DARLASTON

Consolidation...

with 'WACKER' Vibro-RAMMERS

400-600 impacts per minute ensure intensive compaction and the variable number of strokes give maximum efficiency for different materials, both cohesive and non-cohesive.

The model BS 50 (right and top left) is particularly easy to handle in confined spaces such as narrow service trenches. It also has wide application for surface work, embankment consolidation etc.

The larger model, BS 150, can compact up to 20" loose layer and is particularly suited to large scale work such as base courses for concrete slabs, roads, foundations, etc.

- EASILY HANDLED
- ECONOMICAL OPERATION
- SIMPLE MAINTENANCE
- VARIABLE STROKE

OUR DEMONSTRATION UNIT CAN VISIT YOUR SITE — WITHOUT OBLIGATION

DAVID ROBERTS & CO. (ENGINEERS) LTD.

CONTRACTORS AND INDUSTRIAL EQUIPMENT · SPECIALISTS IN STEEL FABRICATION

Head Office: 276, MONUMENT ROAD, BIRMINGHAM 16. Telephone: EDGbaston 2981 PBX

London Office: 58, PETTY FRANCE, S.W.1. Telephone: ABBey 1342 & 2474

LJF

Associated with Stokes Castings Ltd.

The Smaller Company can generally

1. **QUOTE** a lower price because, whilst the cost of materials and wages is practically the same for all, its overhead charges are unquestionably under closer control.
2. **GIVE** a better delivery because its erection staff is limited in number and it is therefore a physical impossibility to accept more orders than it can cope with. In other words, it knows its limitations.
3. **GIVE** each contract personal attention.

We submit these important points for the consideration of Engineers sending out their enquiries for Gas Works Ancillary Plant.

PURIFIERS
WASHERS
PREHEATERS
CONDENSERS
BENZOL PLANTS
TAR EXTRACTORS
TANKS AND CONNECTIONS

KIRKHAM, HULETT & CHANDLER LTD.

Union Foundry, Mansfield Tel. 1256-7

London Office: Stafford House, Norfolk Street, Strand, W.C.2 Tel.: Temple Bar 9910

80 TONS OF COKE PER HOUR FROM LORRY TO STOCKPILE!

C & T LTD.

"WALRUS" LOADER

We will be glad to send you complete details of these and other C. & T. materials handling aids on request

Seldom has so much been moved so quickly (and cheaply) by so few! The photograph shows a lorry tipping coke into a C. & T. "Walrus" Loader, which in turn delivers to a 40 ft. C. & T. Stacker, at the rate of 80 tons per hour. Greater capacities can be achieved by speeding up the machines or by the use of wider carrying belts, and a wide range of loose substances can be handled.

The "Walrus" Loader is the latest C. & T. aid to quicker, cheaper handling of loose bulk. It cuts out all intermediary stages, such as mechanical shovels or manhandling, and enables this type of operation to be performed by only one man—the lorry driver. The Stacker can be attached to the Loader by means of the tow-bar shown, so it is possible for both machines to be retracted simultaneously as the stockpile grows.

C. & T. Loaders & Stackers are extremely mobile and can be towed as far as 200 miles in 12 hours. They are available with diesel or electric drive.

All C. & T. equipment is notable for its sturdy rigid construction.

CRONE & TAYLOR (ENGINEERING) LTD.

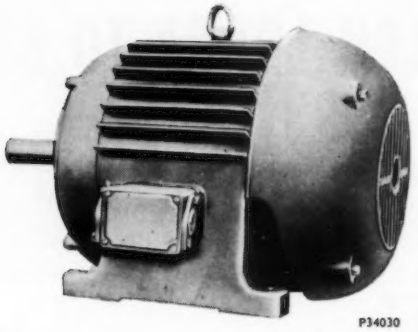
SUTTON OAK, ST. HELENS, LANCS. C & T LTD TELEPHONE: ST. HELENS 3397

CT/1553

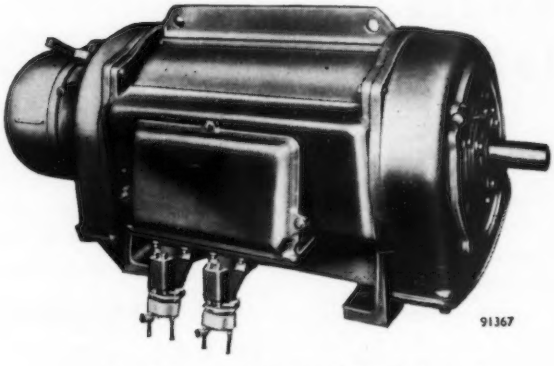
DOESN'T IT STAND TO REASON?

In specifying Metrovick motors you obtain more than compliance with B.S. requirements. Consider the company's research, design and production resources. Add to these the practical advice and service of engineers who really understand the problems of gasworks drives. You then have some of the very good reasons why more and more gasworks are turning to Metrovick motors.

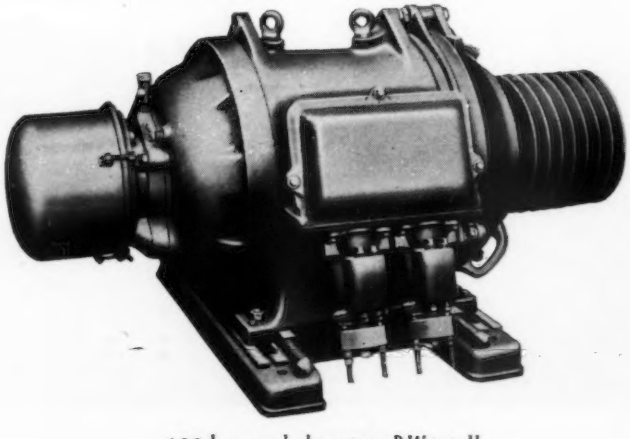
Flameproof motors are also available when required.



Metrovick type KZ squirrel cage totally enclosed fan cooled motors are available up to 40 hp.



100 h.p. and above type HRW high speed (2,960 rpm) drip-proof slipring motor.



100 h.p. and above type RW totally enclosed fan cooled slipring motor.

METROPOLITAN-VICKERS
ELECTRICAL CO LTD · TRAFFORD PARK · MANCHESTER 17

JA?03

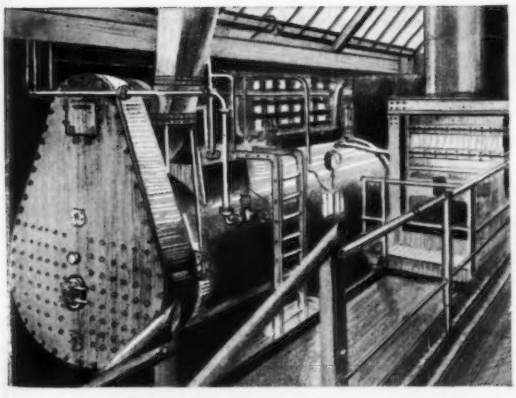
PURIFIER GRIDS FOR TOWER, BOX OR LIQUOR PLANTS · WASHERS & SCRUBBERS ·

REPAIR OF COOLING TOWERS OF ALL DESCRIPTIONS

Fuel Saved

is the main criterion of

Spencer – Bonecourt

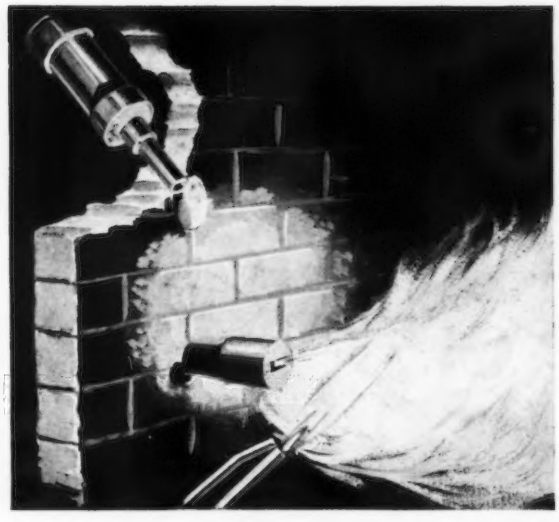


Waste Heat Recovery Systems

Already more than 3,500,000 tons of fuel are saved annually by Spencer - Bonecourt installations designed to meet the needs of diverse industries. A survey of your Works might reveal possibilities of a major reduction in the fuel account to your own and the national advantage.

A Spencer - Bonecourt Specialist is at your service, NOW.

SPENCER - BONECOURT - CLARKSON LTD.,
14/15, Fetter Lane, London, E.C.4



SAFE LIGHTING UP WITH FSM

The new principle of the Elcontrol FSM Flame Failure Equipment is the detection of fluctuating infra-red radiation which is characteristic of every flame.

- **a** FSM Equipment is equally effective on any gas.
- **b** It gives positive discrimination between flame and glowing refractory.
- **c** It does away with difficulties connected with correct siting, excess dust in flame, or probe leakage often encountered with flame conductivity systems.
- **d** Permissible cable run from viewing head to unit up to 100 ft.
- **e** Fully automatic ignition and flame failure control panels are now available, as well as basic on-off control units from under £30.

Send for FSM Data Sheets:

TRADE E MARK

ELCONTROL LTD

10 Wyndham Place, London, W.1

Ambassador 2671

M & M PATENT METER LOCKS

use the STRONGEST, SAFEST METER LOCK

- **DON'T** buy locks you may have to scrap in a few years
- **DON'T** look only at the initial cost
- **DON'T** think only of the present time; look to the future
- **DO** remember that good quality is cheapest in the long run
- **DO** take our word for it that our workmanship is consistently good
- **DO** profit by others' experience and use M. & M. Locks to protect your meters

H. MITCHELL & CO.

36, 38, NEW CHARLES STREET, LONDON, E.C.1

TURBO-COMPRESSORS & EXHAUSTERS FOR AIR AND GAS

* * *

We build a complete range of Compressors & Exhausters for air and GAS, suitable for all purposes connected with the GAS industry, including Turbo-Compressors for large capacities, as illustrated below

WRITE FOR PAMPHLET No. 1018 GIVING PARTICULARS—

REAVELL & CO., LTD.,

RANELAGH WORKS, IPSWICH.

Telegrams: REAVELL, IPSWICH Telephone: 2124 & 5.

Serving the Gas Industry

GIBBONS BROTHERS LIMITED

Contractors for :-

CARBONISING PLANT

CHARGING MACHINES

COAL AND COKE HANDLING PLANT

COKE OVENS

DRESSLER TUNNEL KILNS

FURNACES AND HANDLING PLANT

GAS PRODUCERS

GAS WORKS PLANT

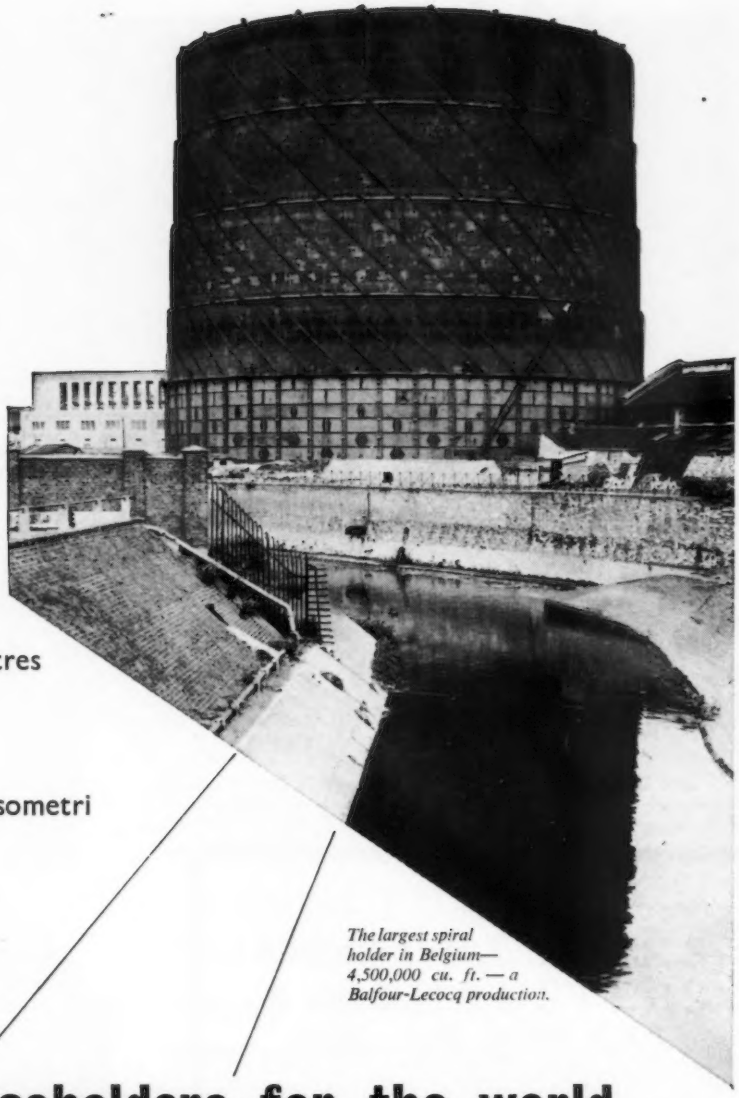
GIBBONS (Dudley) LIMITED.

Manufacturers of :—

- Complete range of refractory goods for gas retort settings and coke ovens in fireclay, silica and siliceous qualities.

GIBBONS

DIBDALE WORKS, DUDLEY, WORCESTERSHIRE: Telephone : DUDLEY 3141.



The largest spiral holder in Belgium— 4,500,000 cu. ft. — a Balfour-Lecocq production.

● Balfour gradi gasometre za ceo svet.

● Balfour construit des gazometres pour le monde entier.

● La ditta Balfour costruisce gasometri per tutto il mondo.

. . . or in other words . . .

Balfours build gasholders for the world . . .

Recently completed gasholders in Brussels and Milan, and those under construction in Jugoslavia and Scotland, bear testimony to the name of Balfour. The reason isn't hard to find. For over one hundred and forty years the Balfour organisation have been to the Gas Industry a source for the planning, manufacture and installation of a complete range of equipment.

Gas production, purification, storage, the recovery of by-products, whatever the problem this wealth of past experience and present ability is at your service.

Balfour OF LEVEN

Henry Balfour & Company Ltd., Artillery House, Westminster, London and Durie Foundry, Leven, Fife

A MEMBER OF THE BALFOUR GROUP OF COMPANIES

Clear Smoke, Fumes and Steam-*quickly*

Power Operated Roof Ventilators—
Installed at Derby Works of Messrs. Qualcast Limited.

MORE and more managements are finding Hills Ventilating Shutters the most effective answer to the problem of maintaining a constantly clear atmosphere in foundries, retort houses and furnace buildings, etc. Easily installed in new or existing buildings, the shutters result in greatly improved working conditions, increased production and reduced absenteeism. Besides rapidly drawing off excessive heat and fumes, and letting in fresh air, Hills Ventilating Shutters effect considerable savings in lighting and cleaning costs by admitting natural daylight. Pivots mounted in self-lubricating bushes, and steelwork rustproofed by the hot-dip galvanising process in Hills own gas fired plant, help to ensure years of efficient trouble-free service in all weathers. Expert advice on all aspects of industrial ventilation can be obtained from our Technical Advisory Department. Fully illustrated literature on request.

HILLS
ventilation division

H'LLS (West Bromwich) LIMITED, ALBION ROAD, WEST BROMWICH, STAFFS. Tel.: WESt Bromwich 1811 (15 lines).
London: Chapone Place, Dean Street, W.I. Tel.: GERrard 0526|9. Branches at Birmingham, Bristol, Leeds, Manchester, Newcastle-on-Tyne, Glasgow and Belfast.

PROTECT *your plant from acid fumes and corrosive gases*

USE 'SUPRUBA'

Chlorinated Rubber Paint

—the material that has been proved

SUPPLIED IN A VARIETY OF COLOURS

Write for full details from

LUNT BROS LIMITED

Colliery Office · Stourbridge · Worcs

Tel: Stourbridge 5201

or from the manufacturers

SUPRA CHEMICALS & PAINTS LTD

HAINGE RD · TIVIDALE · TIPTON · STAFFS · Tel: TIPton 2511/2

ANOTHER SUPRA REGD. TRADE MARK *PRODUCT*

LGB

Specialists in the repair of Reinforced Concrete Structures, etc.

also

LININGS FOR STEEL BUNKERS.

THE

GUNITE

CONSTRUCTION CO. LTD

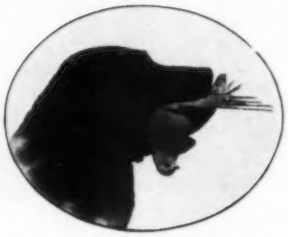
WESTERN HOUSE, HITCHIN, HERTS.

COKE RECOVERY FROM PAN ASH, AND COKE BREEZE WASHING

by the improved

"RETRIEVER"

(REGISTERED TRADE MARK)



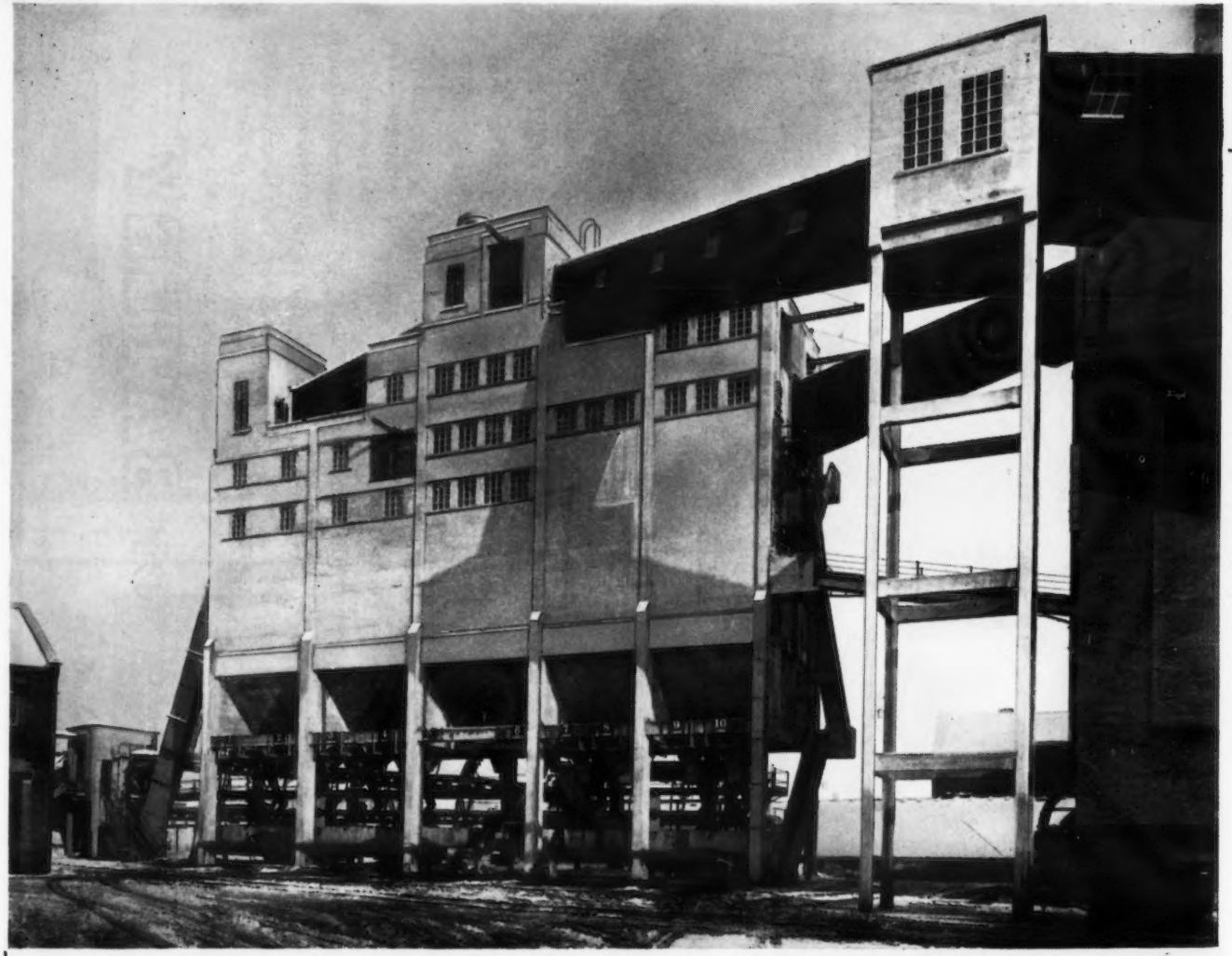
WASHER

Sole makers

CLAPHAM BROS. LIMITED

MAKERS OF GAS WORKS EQUIPMENT SINCE 1837

KEIGHLEY-YORKS - Tel: 2787-2788 - Grams: Clapham Bros., Keighley.



South Eastern Gas Board (Croydon Works).

Main Contractors
for the Coke Handling Plant:
Messrs. Robt. Cort & Son, Ltd.

Consulting Engineers
Messrs. Coignet and Partners

CROWLEY RUSSELL & CO. LTD.

CIVIL ENGINEERING CONTRACTORS

131, VICTORIA STREET, LONDON, S.W.1.

Telephone:
VIC. 7788

ENGINEERS TO THE GAS AND ALLIED INDUSTRIES

40" diameter Fabricated Interconnection Pipes with expansion joint. Note examples of separate expansion joints in foreground. We make these in sizes up to 30" diameter bore.

Group of three Condensers with Cylindrical Shells and detachable ends.

Also specialists in the production of welded fabrications, riveted work, etc.

We invite your enquiries whether they be for reconstruction work, extensions or entirely new installations. We have 65 years of specialised experience.

RILEYS OF BATLEY

A. J. Riley & Son Ltd., Victoria Works, Batley, Yorkshire. Telephone: BATLEY 657 (3 lines) Telegrams: BOILERS BATLEY

National

CLASS 31

'DIRECT ENTRY'

ACCOUNTING MACHINES

for Payroll, Stores, Costing & Credit Sales Accounting

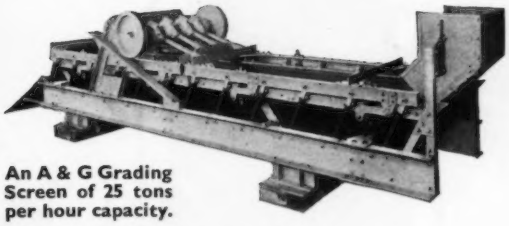
—without question the most efficient and highly developed machine of its kind in the world today. Your most critical investigation is earnestly invited. May we demonstrate?

For appointments to suit your convenience, kindly write or 'phone the Accounting Machine Division of The National Cash Register Company Ltd., 206-216 Marylebone Road, London, N.W.1. PAD 7070

949 OFFICES IN 94 COUNTRIES

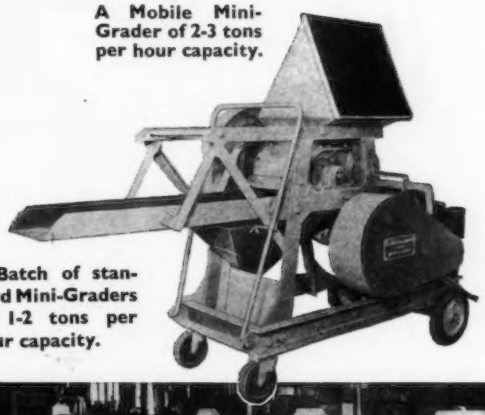
SCREENS

Made in the "Mini-Grader" Range up to 5 tons per hour and in the A & G and Standard range up to 50 tons per hour capacities.

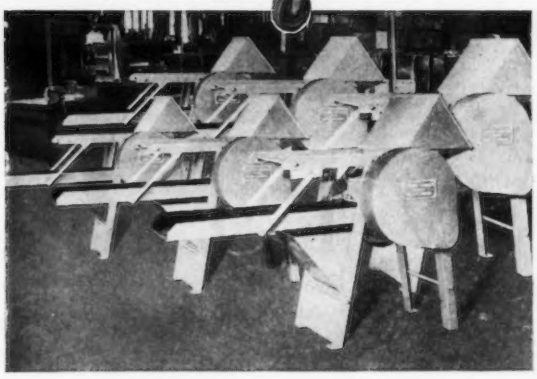


An A & G Grading Screen of 25 tons per hour capacity.

A Mobile Mini-Grader of 2-3 tons per hour capacity.



A Batch of standard Mini-Graders of 1-2 tons per hour capacity.



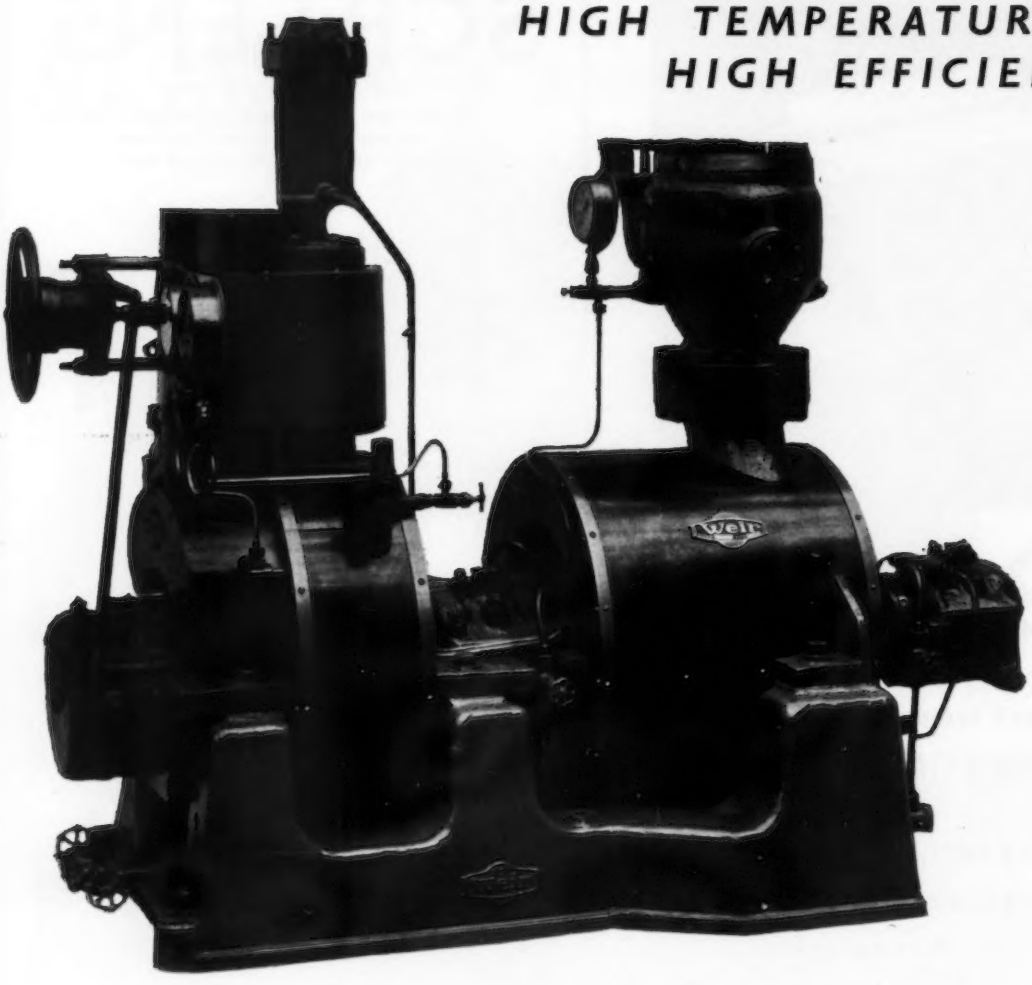
ALDRIDGE & RANKEN LIMITED

AVONBANK WORKS, BATH

Tel.: 2936 & 5711

the last word in gas installations

HIGH PRESSURES
HIGH TEMPERATURES
HIGH EFFICIENCY



WEIR TURBO-FEED PUMPS

Single- and multi-stage pumps in standard sizes and capacities. Automatic in operation, noiseless and free from vibration. Exhaust steam contains no oil and can be used for feed heating or process work. Write for Publication No. GK. 35 "Feeding the Modern Boiler".

FEED HEATERS · DE-AERATORS · FEED REGULATORS
REGENERATIVE CONDENSERS · EVAPORATING AND
DISTILLING PLANTS · OIL FUEL PUMPS · ETC.

G. & J. WEIR LTD
CATHCART : GLASGOW

SIMON ENGINEERING GROUP

THIS SIGN appears in the advertising of a number of firms, which between them provide a wide range of technical services to industry at home and overseas. Behind these services are extensive scientific resources and the experience and reputation of more than seventy years.

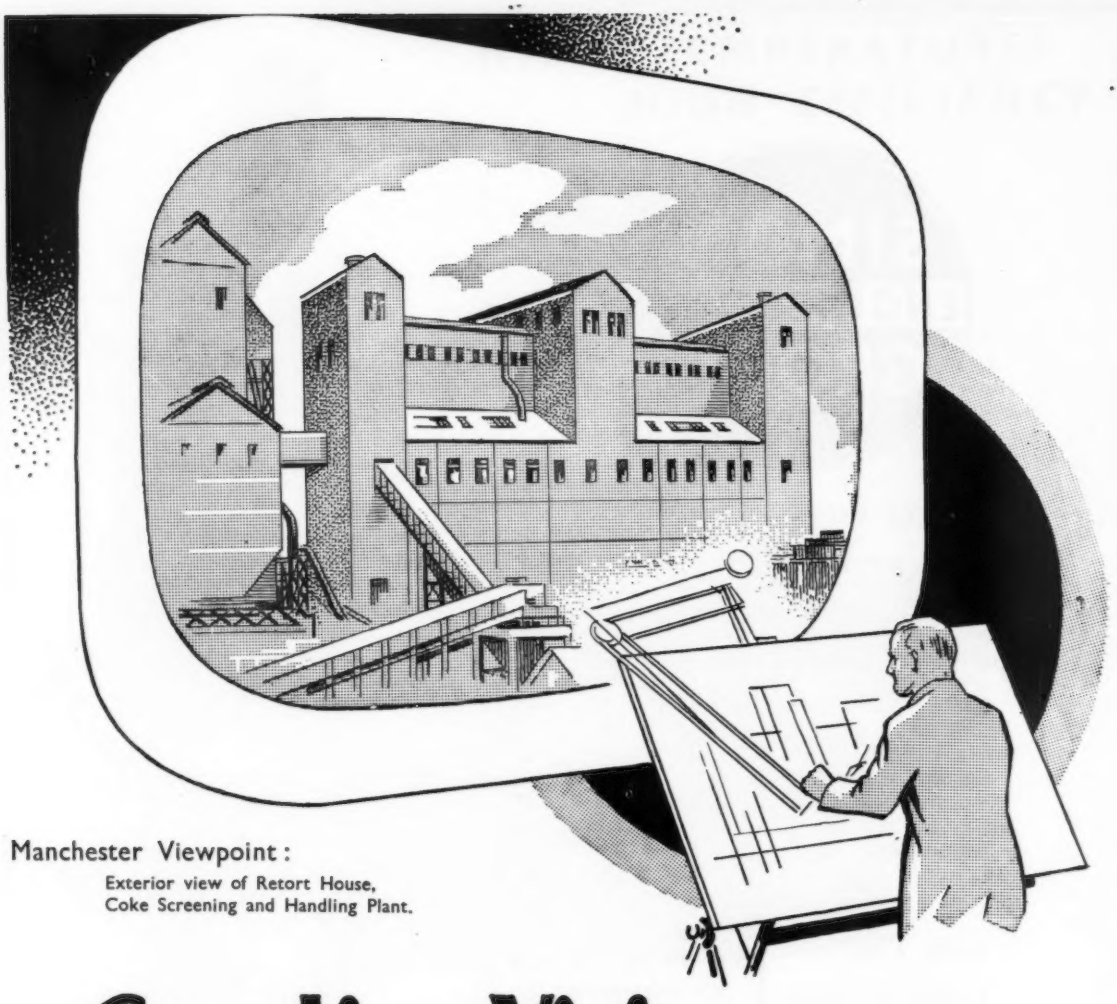
FOR THE COKE & GAS INDUSTRIES:

coal preparation plants and colliery surface equipment
coke ovens, by-product plants and mechanical gas producers
coal and coke handling and storage equipment
water-tube boilers and complete steam power plants
air fan and steam jet forced draught furnaces
electro-precipitators
cyclone dust removal plants
tar distillation plants
crude concentrated ammonia, pure ammonia, ammonium sulphate plants, etc.
complete gasworks ancillary plants and plants for effluent liquor treatment, liquid purification (H_2S removal), sulphur recovery, etc.

SIMON-CARVES LTD · SIMON HANDLING ENGINEERS LTD · HENRY SIMON LTD
HUNTINGTON, HEBERLEIN & CO, LTD · CHEMICAL ENGINEERING WILTONS LTD
TURBINE GEARS LTD · SIMON ENGINEERING (MIDLANDS) LTD · THOS. ADSHEAD & SON LTD

CHEADLE HEATH, STOCKPORT and SIMON HOUSE, 6, STRATTON STREET, LONDON W.1

and associated companies in Europe, Australia, New Zealand, South Africa and South America.



Manchester Viewpoint :
Exterior view of Retort House,
Coke Screening and Handling Plant.

Creative Vision . .

Alert always to newest trends - to improve and not to improvise, has been the salient feature of Drakes service to the Gas Industry for well over a century. Oldest in unbroken sequence and prominent still with the latest and best.

1847 D 1955

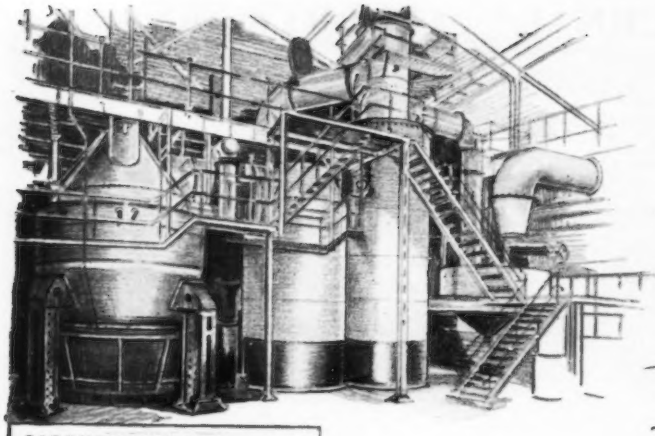
DRAKES of HALIFAX

TELEPHONE: HALIFAX 701 P.B. Ex. TELEGRAMS: DRAKEFAX HAL FAX

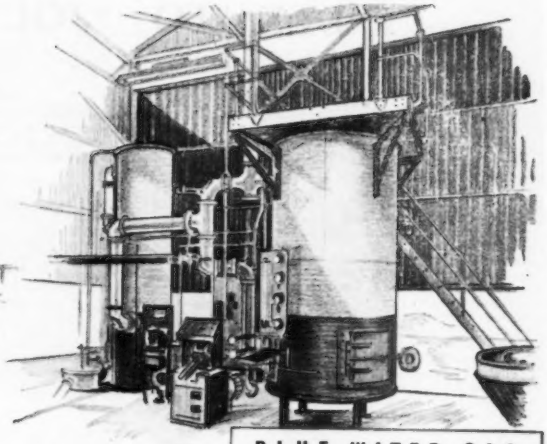
CONSTRUCTIONAL GAS ENGINEERS FOR MORE THAN A CENTURY

INDEX TO 'JOURNAL' ADVERTISERS

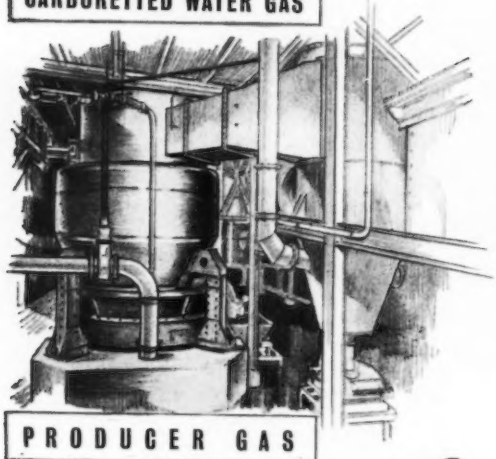
	PAGE
A	
.C.E. Machinery, Ltd.	
bbott, Birks & Co., Ltd.	
cme Wringers, Ltd.	
erogen Co., Ltd.	
erograph Co., Ltd.	
lder & Mackay, Ltd.	
ldridge & Ranken Ltd.	827
llan Taylor (Engineers), Ltd.	
llen, John & Son (Oxford) Ltd.	810
mal, Ltd.	
scot Gas Water Heaters, Ltd.	
scot Gas Water Heaters, Ltd. (F. A. Neat)	
shmore, Benson, Pease & Co.	
shworth & Parker, Ltd.	
spinall's (Paints), Ltd.	
ssociated Lead Manufacturers, Ltd.	
ssociated Lead Manufacturers, Ltd. (Rustodian)	
tlas Preservative Co., Ltd.	
udley Engineering Co., Ltd.	
utocontrol Boilers, Ltd.	
utomatic Telephone & Electric Co., Ltd.	
utomotive Products, Ltd.	
verill, C. R., Ltd.	
B	
Bale & Church, Ltd.	865
Balfour, Henry, & Co., Ltd.	822
Bayley, Thos. (Great Bridge) Ltd.	
Begwaco Meters, Ltd.	
Benham & Sons, Ltd.	
Blakeley Firth, Sons & Co., Ltd.	
Bolton's Superheater & Pipe Works Ltd.	
Booth, John, & Sons (Bolton), Ltd.	
Bratt Colbran, Ltd.	
Bray, George, & Co., Ltd.	
Bray, W. E., & Co., Ltd.	
British Flint & Cerium Manufacturers, Ltd.	
British Gas Purifying Materials Co.	
British Jeffrey-Diamond, Ltd.	814
British Oxygen Co., Ltd.	811
British Paints, Ltd.	
British Rototherm Co., Ltd.	
British Thermostat Co., Ltd.	
British Thomson Houston, Ltd.	
British Tyre & Rubber Co., Ltd.	
British Vacuum Cleaner & Engineering Co., Ltd.	
Broadbent, Thomas, & Sons, Ltd.	
Brockhouse Heater Co., Ltd.	
Broom & Wade, Ltd.	
Brown, J., & Co., Ltd.	864
Bugden, Thos., & Co.	
C	
Cambridge Instrument Co., Ltd.	
Cannon (G. A.), Ltd.	
Cascade Water Coolers, Ltd.	863
Cathodic Corrosion Control, Ltd.	
Cementation Co., Ltd.	
Chaseside Engineering Co., Ltd.	
Cinema-Television, Ltd.	
Clapham Bros., Ltd.	824
Clayton, Son & Co., Ltd.	810
Clifford Engineering Co., Ltd.	
Cochrane (Middlesbro') Foundry, Ltd.	
Cohen, George, Sons & Co., Ltd.	
Concrete Proofing Co., Ltd.	
Consolidated Pneumatic Tool Co., Ltd.	
Consett Iron Co., Ltd.	
Crane, Ltd.	
Crone & Taylor, Ltd.	817
Crosby & Co., Ltd.	819
Crossley Bros.	
Crowley Russell, & Co., Ltd.	825
Curtis, A. L., & Co.	
Cutler, Samuel, & Sons, Ltd.	847
D	
Davenport Engineering Co., Ltd.	
Davey, Paxman & Co., Ltd.	
Deb Chemical Proprietaries Ltd.	
De la Rue, Thomas, & Co., Ltd. (Gas Group)	
Dempster, R. & J., Ltd.	809
Dempster, Robert, & Sons, Ltd.	849
Denison & Son, Ltd.	
Derbyshire Silica Firebrick Co., Ltd.	
Diaphragm & General Leather Co., Ltd.	
Dick, R. & J., Ltd.	
Donkin (The Bryan) Co., Ltd.	Cover II
Douglas, Wm., & Sons, Ltd.	
Drakes, Ltd.	830
Dresser Manufactures (England), Ltd.	
Drew, H. B., Ltd.	
Drummond Patents Ltd.	864
Dunlop Rubber Co., Ltd. (Gen. Rubber Goods Division)	
E	
E.B. Refractory Cement Co., Ltd.	
Edgar, William, & Son, Ltd.	
Elcontrol, Ltd.	820
Electroflo Meters Co., Ltd.	
Electrolux, Ltd.	
Elliott Bros. (London), Ltd.	
Essard Ltd.	
Ether, Ltd.	
Ewart & Sons Ltd.	
Ewart Chainbelt Co., Ltd.	
F	
Fielden Electronics, Ltd.	
Fisher & Ludlow, Ltd.	
Fisher Governor Co., Ltd.	
Flavel, S., & Co., Ltd.	860
Fowler, John, & Co. (Leeds), Ltd.	
Franki Compressed Pile Co., Ltd.	813
Franklin Furnace Co., Ltd.	
Fry's Metal Foundries, Ltd.	
Furmanite Engineering Co. (1929) Ltd.	
G	
Gas Purification & Chemical, Ltd.	865
General Descaling Co., Ltd.	
General Electric Co., Ltd.	
General Gas Appliances, Ltd.	
Gibbons Bros., Ltd.	821
Glover, George, & Co., Ltd.	
Glover, Thomas, & Co., Ltd.	834
Godfrey, Sir George, & Partners (Industrial), Ltd.	
Goodall Clayton & Co., Ltd.	864
Goodyear Mechanical Goods	
Grant, Lyon, & Co. Ltd.	
Graphite Products, Ltd.	
Green & Boulding, Ltd.	865
Gunite Construction Co., Ltd.	824
H	
Hamilton, A. H., & Co., Ltd.	
Hardman & Holden, Ltd.	
Harris & Pearson, Ltd.	866
Harrisons (London), Ltd.	865
Harvey, G. A., & Co. (London), Ltd.	
Hattersley & Davidson	
Hayward, E. & Co. (Fabrications) Ltd.	
Hick Hargreaves & Co., Ltd.	
Hilmor, Ltd.	
Hills (West Bromwich), Ltd.	823
Holman, Michell & Co., Ltd.	
Holmes, W. C., & Co., Ltd.	867
Honeywell Brown, Ltd.	
Hopkinsons, Ltd.	
Horseley Bridge & Thomas Piggott, Ltd.	
Horstmann Gear Co., Ltd.	
Howden, James, & Co., Ltd.	
Humphreys & Glasgow, Ltd.	832
I	
Ideal Boilers & Radiators, Ltd.	
I.C.I. Ltd. (Fyffes Fittings)	
I.C.I., Ltd. (Metals Division	
Inertol, Ltd.	
Ingham, John, & Sons, Ltd.	833
J	
Jeavons, E. E., & Co., Ltd.	
Jeavons Engineering Co.	
Jenkins, W. J., & Co., Ltd.	
Johnson, C. H. (Machinery), Ltd.	
K	
Keay, E. C & J., Ltd.	814
Keith Blackman, Ltd.	868
Kent, Geo., Ltd.	
Kings Patent Agency, Ltd.	865
King, Walter, Ltd.	865
Kirk & Co. (Tubes), Ltd.	
Kirkham Hulett & Chandler, Ltd.	816
L	
LaFarge Aluminous Cement Co., Ltd.	
Laidlaw, R., & Son (Edin.), Ltd.	
Lamont, James H., & Co., Ltd.	
Lancashire Dynamo & Crypto, Ltd.	
Le Bas Tube Co., Ltd.	
Leeds Fireclay Co., Ltd.	
Lindsay, Henry, Ltd.	
Lionweld, Ltd.	
Lind, Peter, Ltd.	
M	
Macpherson, Donald, & Co. Ltd.	
Magnetic Valve Co., Ltd.	
Main, R. & A., Ltd.	852
Meltham Silica Fire Brick Co., Ltd.	
Meters, Ltd.	
Metropolitan Leather Co., Ltd.	
Metropolitan Vickers Electrical Co., Ltd.	818
Milnes Meters, Ltd.	
Mint, Birmingham, Ltd.	
Mitchell Engineering, Ltd.	
Mitchell, H., & Co.	820
Moler Products, Ltd.	
Monitor Engineering & Oil Appliances, Ltd.	
Monk, A., & Co., Ltd.	
N	
National Benzole Co., Ltd.	
National Cash Register Co., Ltd.	827
National Enamels, Ltd.	
New Conveyor Co., Ltd.	
Newton Chambers & Co., Ltd.	
Norwest Construction Co., Ltd.	
Nu-Swift, Ltd.	
O	
Oxley Engineering Co., Ltd.	
P	
Parkinson & Cowan (Gas Meters), Ltd.	834
Parkinson Stove Co., Ltd.	facing p. 841
Pass, E., & Co., Ltd.	
Peebles & Co., Ltd.	
Perl Controls, Ltd.	
Power-Gas Corporation, Ltd.	
Press, William, & Son, Ltd.	
Pulsometer Engineering Co., Ltd.	Cover IV
R	
Radiant Heating, Ltd.	
Radiation, Ltd.	850, 851
Rawlplug Co., Ltd.	
Reavell & Co., Ltd.	820
Remington Rand, Ltd.	
Ride & Bell, Ltd.	
Riley, A. J., & Son, Ltd.	826
Roberts, David, & Co. (Engineers) Ltd.	815
Roberts, R. E., & Sons, Ltd.	
Robinson, J. H., & Co. (Liverpool), Ltd.	
Rook Bros., Ltd.	865
Royston, Geo., & Sons, Ltd.	
Rozalex Ltd.	
Russell, R., & Sons, Ltd.	
S	
Salter, T. E., Ltd.	
Sankey-Sheldon Ltd.	
Senior Economisers, Ltd.	
Shaw & McInnes Ltd.	
Shelton Iron, Steel & Coal Co., Ltd.	
Siebe Gorman & Co., Ltd.	
Sieber, Jas., Equipment Co., Ltd.	
Siemens-Schuckert (Great Britain), Ltd.	
Sigma Instrument Co., Ltd.	
Simon-Carves, Ltd.	829
Simon, Richard, & Sons, Ltd.	
Sisson, W., & Co., Ltd.	
Smith Meters, Ltd.	
Smith, Thos., & Sons (Rodley), Ltd.	
Spencer Bonecourt, Ltd.	819
Sperryn & Co., Ltd.	
Stanton Ironworks Co., Ltd.	
Staveley Iron & Chemical Co., Ltd.	
Steels Eng. Products, Ltd.	
Stein, John G., & Co., Ltd.	
Stelcon (Industrial Floors) Ltd.	
Stewart & Gray, Ltd.	
Stewarts & Lloyds, Ltd.	
Stoves, Ltd.	
Strachan & Henshaw, Ltd.	Cover I
Stringer Bros.	
Sugg, Wm., & Co., Ltd.	
Summerson, Thos., & Sons, Ltd.	
Supra Chemicals & Paints, Ltd.	824
Sutcliffe, R., Ltd.	
Sutcliffe Speakman & Co., Ltd.	
Sutherland, A. G., Ltd.	
T	
T & T Works, Ltd.	
Tangyes, Ltd.	
Taylor Bros.	
Thermal Syndicate, Ltd.	
Thomas & Bishop, Ltd.	
Thompson, Edward, Ltd.	
Thompson, John, Conveyor Co.	
Thorp, Thomas, & Co., Ltd.	
Tully Engineering Co., Ltd.	
Turners Asbestos Cement Co., Ltd.	
U	
Underpressure Engineering Co., Ltd.	864
United Kingdom Construction & Engineering Co., Ltd.	
Unit Superheater & Pipe Co., Ltd.	863
V	
Vaughan, Edgar & Co., Ltd.	
Visco Engineering Co., Ltd.	
Vulcan Stove Co., Ltd.	
W	
Wakelin, F. H., Ltd.	
Walker, C. & W., Ltd.	860
Walker, Crosweller & Co., Ltd.	
Walker, Wm., & Sons (Hanley), Ltd.	
Waller, George, & Sons, Ltd.	
Walter King, Ltd.	865
Ward, Thos. W., Ltd.	
Watson, Robt., & Co., (Constructional Engineers) Ltd	
Weir, G. & J., Ltd.	828
Wellington Tube Works, Ltd.	
Wellman Smith Owen Engineering Corpn., Ltd.	
West's Gas Improvement Co., Ltd.	Cover III
West's Gas Improvement Co., Ltd. (C.O.L. Division)	
West's Piling & Construction Co.	
Westwood & Wrights, Ltd.	
Whessoe, Ltd.	
Whitley Moran & Co., Ltd.	
Whittaker Hall & Co. (1929), Ltd.	
Wilkes, A. H., & Co., Ltd.	
Willey & Co., Ltd.	
Williams, John E., Ltd.	
Williamson Cliff, Ltd.	
Wilson, George, Gas Meters, Ltd.	
Winn & Coales, Ltd.	
Woodall-Duckham Construction Co., Ltd.	facing p. 840
Wood, Hugh, & Co., Ltd.	812
Wormald Patent Locks Co., Ltd.	864
Y	
Yorkshire Copper Works, Ltd.	
Appointments Vacant	865, 866
Appointment Wanted	
Contracts Open	
Educational	
Fellowship	866
Miscellaneous	
Patents	865
Plant For Sale	865
Publications	



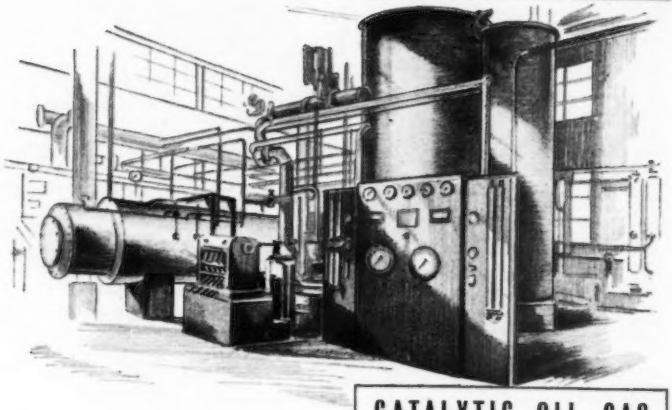
CARBURETTED WATER GAS



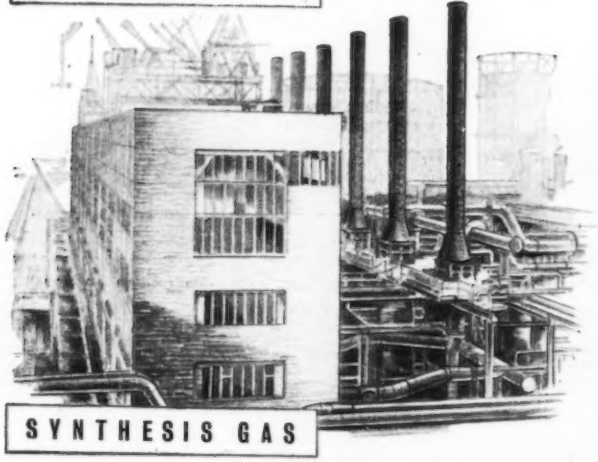
BLUE WATER GAS



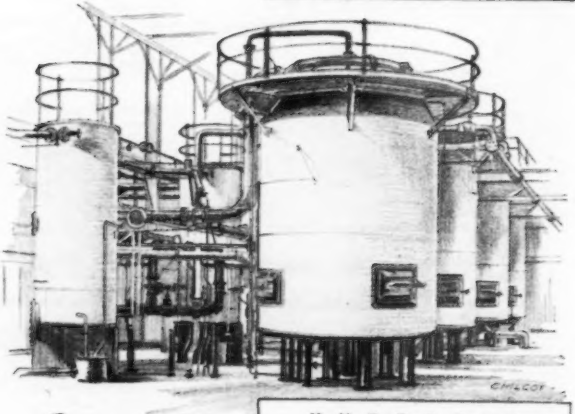
PRODUCER GAS



CATALYTIC OIL GAS



SYNTHESIS GAS



HYDROGEN

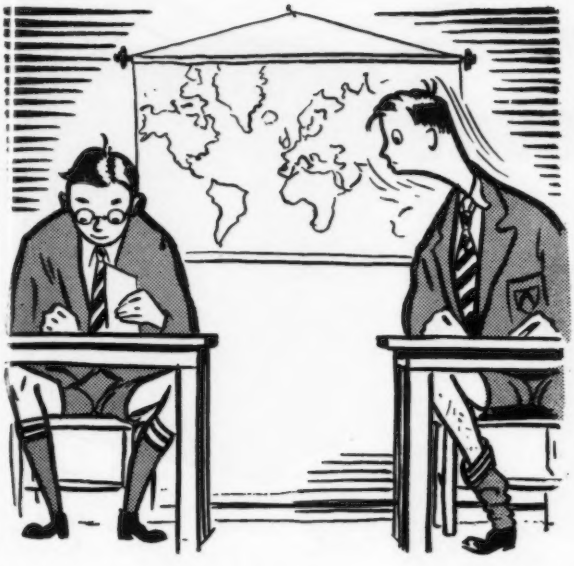
Installations by

HUMPHREYS & GLASGOW LTD

HUMGLAS HOUSE · CARLISLE PLACE · LONDON · S·W·1

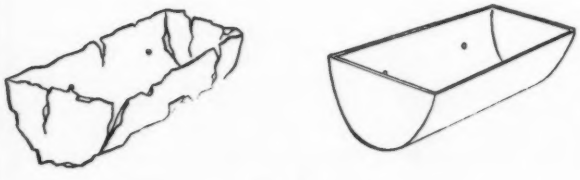
Telephone VICtoria 3961

ESTABLISHED 1892



Exact Duplication

It is many years since we learned that initiative is superior to appropriation. We devised our own method of exact duplication and it works very well, which is not surprising considering our close attention to the subject. For proof — send us a worn or damaged elevator bucket—whatever the pattern we can guarantee *exact* duplication.



INGHAM FOR STRENGTH

JOHN INGHAM & SONS LIMITED
MIDDLESTOWN - - WAKEFIELD

Telephone : Horbury 49/50

dm JI. 102

Gas Journal

VOL. 281 NO. 4791 MARCH 30, 1955

107TH YEAR

MANAGING DIRECTOR: Clifford A. King
EDITOR: Trevor G. Williams, A.M.I.Mech.E., Assoc.Inst.Gas E., M.Inst.F.
DEPUTY EDITOR: Arthur C. Cross

Published by Walter King Limited,
11, Bolt Court, Fleet St., London, E.C.4

Telephone: Central 2236-7. Telegrams : Gasking, Fleet.

CONTENTS

EDITORIAL COMMENT

A Major Decision .. 835
The Select Committee .. 836
'Si Monumentis . . .' .. 836
'The Happy Home' .. 836
Novelties from France .. 837
Splashing the Headlines .. 837

TECHNICAL RECORD

Gas and Modern Production. By A. E. Tyrrell .. 839
Iron Bacteria in Gasholder Water. By A. R. Mitchell .. 845
Transportation of Bog Ore. By H. C. Walker .. 854
Ammonia Liquor as a Nitrogenous Fertilizer. By Henry Tod and Kenneth Simpson .. 857

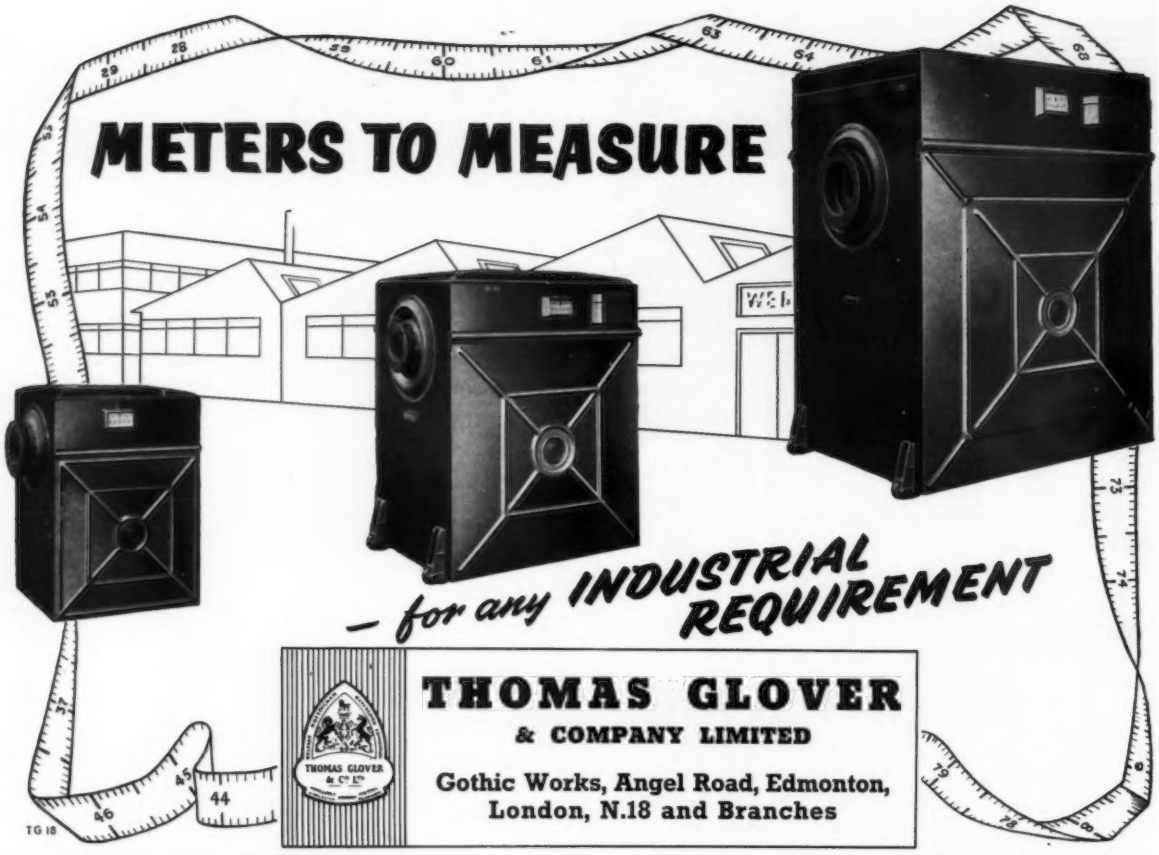
SPECIAL ARTICLE

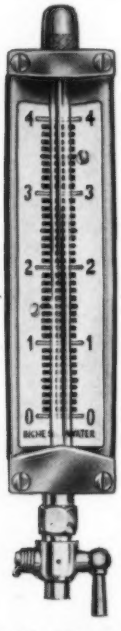
Report on Gas in France. By 'Ashton' .. 848

NEWS OF CURRENT EVENTS

Personal .. 838
Obituary .. 838
Diary .. 838
Half a Century of Service .. 859
Coal Industry Wages .. 859
Gas Men to Box at Basle .. 859
'Trying to Create a Monopoly' .. 859
Natural Gas and British Firms .. 859
Women's Gas Federation Activities .. 861
Plant Engineers' Opportunities .. 861
Yorkshire Juniors .. 861
News in Brief .. 862
The National Coal Board's Organization .. 862
Ideal Home Exhibition .. 862

PUBLISHERS' NOTICE, SEE PAGE 865





A New Design

4" Water Gauge

This addition to our wide range of single tube and double limbed pressure gauges is made with a die-cast body, and is ideal for governed pressure industrial appliances.

PARKINSON AND COWAN INDUSTRIAL PRODUCTS

(A DIVISION OF PARKINSON & COWAN LTD)

DEPT. Q COTTAGE LANE, CITY ROAD, LONDON EC1 Tel: CLErkenwell 1766/7

PG1

Gas Journal

VOLUME 281. No. 4791. MARCH 30, 1955. 107th YEAR

A Major Decision

IN our last issue, we announced a scheme whereby the South Eastern Gas Board and the British Petroleum Co., Ltd., have agreed jointly to examine the practicability of building a plant to convert petroleum products available at the Company's Kent oil refinery to town gas of acceptable quality. This project envisages the large scale manufacture of oil gas in a plant to be erected at the refinery and its subsequent supply to the Board's gas grid; it also proposes the use of the well-known SEGAS process developed by the Board for the production of gas from the oil feedstocks. The initial installation would convert some 50,000 tons of petroleum products a year to gas, the equivalent of 15 mill. cu.ft. a day, and would be designed for expansion to three times that capacity.

Even for an area gas board, 15 mill. cu.ft. of gas a day is a substantial quantity and, if the eventual output of the proposed refinery oil gas plant multiplied three times, it would be impressive indeed! Obviously, the South Eastern Gas Board has given very careful consideration to the problem of the supply of the raw materials which it must have to maintain and expand its production of gas and coke. As in the case of the other boards, it has had to face increase after increase in the price of its coal and as it has an area which is one of the most remote from the main coalfields of this country, it is not surprising that it should take the whole question of alternative supplies of gas very seriously. It is true that the South Eastern Board has one of the best fleets of colliers owned by an area gas board—a legacy from some of those gas companies which merged to form the Board on nationalisation—but this does not alter the fact that the coal now obtainable is not all that might be desired, either as to price, quality or quantity. Even the most incurable optimist would find little to encourage the belief that, in the foreseeable future, our economy will again be based on a cheap and plentiful supply of coal—and since it is not the business of an area gas board to indulge in idle optimism but rather to keep its feet firmly on the ground, the action of the South Eastern Gas Board in proposing this scheme is prompted by a sober appreciation of reality.

Plainly stated, the facts are these: most of the coal which the South Eastern Gas Board uses for carbonization has to be brought two to three hundred miles by sea from Durham and Yorkshire, while oil is being refined from crude in vast quantities within the Board's own area with a resulting availability of certain fractions suitable for oil gasification. The question of the cost of the oil will, no doubt, form an important part of the negotiations between the gas board and the petroleum company but, fortunately, the technical aspects of the problem of producing a suitable gas from a variety of feedstocks has already been solved.

The gas industry of this country has purchased, and is purchasing, large quantities of gas from coking plants belonging either to the steel industry or to the National Coal Board and, in many cases, it has obtained this gas at a very advantageous price. It would not be too much to say that consumers in certain areas could not enjoy the relatively cheap gas which they receive were it not for the valuable contribution which these coking plants are making to their supply. Furthermore, it is quite understandable that the gas industry should be able to drive a hard bargain with the coking plants on the matter of price for their surplus gas, since the latter is a commodity which is likely to interest only one potential purchaser, i.e., the local gas undertaking. With the oil companies, however, it is a rather different story. These companies have a number of outlets for their products and are consequently in a stronger position when it comes to bargaining about price. This fact has already emerged from the breakdown in the negotiations which took place some time ago between the Southern Gas Board and the Esso Petroleum Co., Ltd., regarding the possibility of the gas board taking gas from Fawley refinery. It is perhaps significant that these latter negotiations are to be re-opened as a result of the recent announcement of the agreement between the South Eastern Gas Board and the British Petroleum Company.

Clearly, a major decision has been taken by the South Eastern Gas Board, one which is likely to have far-reaching effects on the future manufacturing policy of the Board. A definite association with, and dependence on, the oil industry has been considered and accepted. In this case, it was not a question of determining whether to take more or less oil for oil gas or carburetted-water-gas manufacture at gasworks but rather to regard an oil refinery itself as a major gas manufacturing station. No doubt the full implication of such a scheme has been fully examined, for it does seem to us that most definite and contractual assurances from the petroleum company will be required before the gas board can undertake the large-scale main-laying operations which will be needed to connect the refinery with

the South Eastern grid and before any of the existing gas manufacturing stations can be closed down. The pattern of utilization of petroleum products can and does change with changing techniques in other industries and it will be most necessary to ensure that the gas board's supply of gas from the refinery could not be diminished or interfered with by any later changes in the policy of the petroleum company. Included in any pledge covering the maintenance of gas supplies should be a firm cost basis for, once the gas board is committed to supplying a large number of its consumers with gas from the refinery, it will be extremely vulnerable to any increase in the price of the raw material.

One thing is evident—since the war, the gas industry has moved very far and very fast in its fundamental gas-making techniques. In many ways it has had to. In pre-1939 days, for instance, it would have been regarded as little short of heresy to advocate the use of oil gas for base load purposes and there were, of course, good reasons at the time for holding such a view. Since then, however, many things have passed into the limbo, among them that plentiful and reasonably-priced coal on which the gas industry has built its strength. The latest move by the South Eastern Gas Board is yet another sign that the industry is willing to face the facts, distasteful as they may be, and to plan its future with 'eyes front'.

The Select Committee

THE nationalised gas industry attains its sixth official birthday tomorrow, and soon the Gas Council and the area boards will be applying themselves to the task of showing in their annual reports and accounts how far the industry has succeeded in meeting the growing needs of its consumers and in making financial ends meet. The fifth year showed an overall decrease of 0.4% in gas sales, despite a rise of some 3% in industrial consumption, but if the contrast in temperature and weather conditions is any criterion the sixth year's statistics will disclose a considerable change. To what extent the operations of the gas industry, and those of the other nationalised bodies, will come under Parliamentary examination in the future will depend on the outcome of the motion which has just been tabled by the Government to set up a Select Committee on the Nationalised Industries in accordance with the undertaking given in July of last year. The Government decided to set up the Select Committee on the recommendation of another Select Committee, which made a report in 1953.

It will be the duty of the Committee to obtain further information as to such of the current policy and practices of the nationalised industries as are not matters which (a) have been decided by or clearly engage the responsibility of any Ministers; (b) concern wages and conditions of employment and other questions normally decided by collective bargaining arrangements; (c) are to be considered through formal machinery established by the relevant statutes; or (d) are matters of day-to-day administration. Not all the recommendations of the earlier Select Committee have been adopted; in particular the Government has not agreed that the new Committee should be a permanent body, or that its staff should include an officer of the status of the Comptroller and Auditor-General. It is to be appointed on a sessional basis for the time being and its work will be regarded as experimental.

When the report of the earlier Select Committee was published nearly two years ago we invited Members of both sides of the House, and representative leaders of the pre-nationalisation gas industry, to express their views on it. Broadly speaking they were all, with the exception of one or two diehards, in favour of giving the proposal a trial, though they were alive to the dangers inherent in having a Commmittee which might tend to interfere with the day-to-day operations of an industry that has always been noteworthy for its smooth running. If the new Committee assists in the promotion of the industry's public relations, so far as Members of Parliament are concerned, it will serve a useful purpose.

'SI MONUMENTIS . . .'

DEMPSTERS of Elland last Friday celebrated their centenary. A magician's wand had waved and the selected date coincided with a joint visit of the Manchester and the North of England Sections of the Institution of Gas Engineers to the Tingley gasworks. Thus nearly 250 gas engineers assembled at the Queen's Hotel, Leeds, to enjoy a Lucullan banquet and pay tribute to Robert Dempster & Sons, Limited, a firm 'who prefer to build up to a standard rather than down to a price.' That trenchant phrase was spoken by Mr. George Currier, who proposed the toast of the evening, and how aptly it applies to many of those fine old firms which have served the gas industry over the years. We ourselves like to think a similar preference activated Thomas Barlow, who built gasworks and then, 106 years ago, began to build the 'GAS JOURNAL.' The centenary was also marked by the publication of a handsome volume illustrated in full colour. Therein can be traced the history of the family and firm since Robert Dempster at the age of 15 left his native Cupar to learn meter making with Cochrane's of Edinburgh, later travelling south to a junior appointment with the Phoenix Gas Company, of London. We are reminded also of the initiative and ability of those of his successors whom we ourselves remember well—J. W. Broadhead, E. J. King, W. H. Handley. It was a proud inheritance; and under the managing-directorship of B. C. Morton, who joined the firm in 1907, Dempsters of Elland start another century with the good wishes of the whole gas industry.

'THE HAPPY HOME'

WE have already made mention in previous issues of the JOURNAL of the publication which has been compiled by the Good Housekeeping Institute in collaboration with the Gas Council. 'The Happy Home' made its first appearance at the Ideal Home Exhibition and will be on sale in the bookshops very soon, and we have no doubt that it will be eagerly bought by housewives as it contains comprehensive guides to everything a woman might want to know in connection with her home from the initial planning and furnishing of the house to ensuring happy personal relationships between the members of her family.

No longer need housework be synonymous with drudgery and no longer need the kitchen be the dreary apartment it used to be. The chapter 'New Kitchens for Old' contains several photographs of kitchens which have been specially planned to eliminate unnecessary labour and with an eye to brightness, airiness and cheeriness, even in the smallest of them. Extensive mention has been made of gas sink heaters, ensuring constant hot water within a

few seconds, and the variety of gas cookers which are available to suit any pocket are well illustrated. This chapter also contains comprehensive notes on the care and cleaning of gas kitchen appliances, and these will help to ensure their longer life and maximum efficiency.

Nowadays there is no necessity for the housewife to wake up on a Monday morning with her heart heavy at the thought of the weekly 'wash.' 'Home Laundrywork' gives in great detail the soaps and detergents to be used in the gas washing machines, how to contend with the problem of hard water, and the weights of various items of clothing and household linen to avoid overloading the gas washers. A study of this chapter must lighten considerably this often onerous task.

With a continually rising cost of living the rule these days, budgeting in the home has become a vital factor and 'The Happy Home' devotes a chapter to this important aspect which will be a great help, especially to the young wife newly embarking on married life. Not only is the financial budget dealt with, but also one of a different commodity—the commodity of time. Through inexperience, so many women find the end of day approaching, when the family are due to return home, with so many of the necessary chores incomplete—and through lack of method, they are tired out and jaded. The importance of working to a system to save labour and time, and keep the wife bright for the return of her husband and children, is recognized by the compilers of this volume and several suggested routines are outlined.

The usual high-standard recipes which we have come to rely upon from the Good Housekeeping Institute are given in a separate file and the chapters 'Good Eating' and 'Cooking Craft' speak for themselves. There are beauty hints, notes on home nursing and general health, a guide to the hostess and many useful tips on running repairs. Altogether this is a most valuable book to all those interested in their homes and one that cannot help but do the gas industry a lot of good.

NOVELTIES FROM FRANCE

IN our report on gas in France we note some interesting novelties in gas engineering (and sales) practice. There is the electro-magnetic method of detecting thin places and perforations in gasholder sheeting. There is room for something new here. The old method of sounding with the hammer is not very satisfactory unless followed by a trial drilling. The principle of the new method seems to be the measurement of the slight current induced in a momentary magnetic field set up in the plate—the strength of the current being proportional to the amount of metal present. 'The apparatus appears so far to give an elegant solution of the problem of examining the thickness of plates of gasholders in service.' And it is readily portable.

The second novelty is the use of ultrasonic vibrations for the precipitation of tar globules and dust particles from gases in which they are held in suspension—the Ultrasonic Detarrer. The principle of the process is that, if the frequency of vibration set up by sound waves in the gas is high enough, the inertia of the particle is sufficient to separate it from the movements of the gas . . . It is possible to find an optimum frequency of vibration to produce agglomeration and, therefore, precipitation of particles or drops held in suspension in gases. Fortunately, this optimum is at the limit of audible sound so that the method can be applied without creating an unpleasant noise. There may be quite a number of difficulties yet to be overcome, but a steam-driven siren (as proposed by the Cie des Compteurs) seems to promise distinct advantages over the rather dangerous high-voltage electrical apparatus now in use for this purpose.

The 'Certificate of Gas Comfort' instituted by the Belgian Royal Association of Gas Engineers, has also undeniable novelty. The idea is that if it is certified that residential or other property is equipped with the necessary, and properly designed and installed, 'facilities for the occupants to enjoy all the comforts which can be realized by the use of town gas,' the value of the premises will be enhanced, making it worth while to the proprietor or his architect to apply for the certificate and to mention its possession in advertising the premises for sale or hire.

SPLASHING THE HEADLINES

NEWS from Greenford, Middlesex, of gas appliances ejecting water instead of gas one Sunday morning, opens the more liberal mind to serious conjecture. It is our view, for instance, that this particular incident is just one more step towards universal surrealist thought. And why not? Consumer industry is as free as anybody else to express itself in original and unrestricted terms. Only the Browns and Smiths of this world could possibly complain. But if Mr. Picasso had seen this he would merely have sighed ecstatically and painted a water-spouting gas-ring, calling the work 'Spring Comes to the Edgware Road.' And the inspired Mr. Dali would have growled, lifted his waistcoat to scratch his ear and resumed lurking under the dining room table (where he is said to keep his inspiration). So what are you grumbling at Mrs. Brown? *Do* try to think more freely. We always boil our kettle on the wireless set anyway.

The only other possibility we can imagine is that the deed was by the hand of an unbalanced and independent temperance advocate. If it was so, then this was a masterstroke of mad genius. One can imagine the effect on a husband who had four pints on the Saturday night and is now about to clear his head at the Pig and Whistle. As he greyly says farewell to his wife, the cooker suddenly turns to a fairyland Trafalgar Square; the rings with their tall fountains, the grill issuing a sparkling archway . . . Canvassers with copies of the Pledge ready for signature could score an enormous success. Finally, do not let us ignore any potential entertainment or practical value that this mishap may suggest to us. An interchangeable gas/water cooker could not only provide a bright and amusing coloured fount for dull mornings; the pistol lighter could be used to amuse the kiddies and wash down the walls.

CAMBRIDGE INSTRUMENT CO., LTD.

Since the recent establishment of their additional factory at North Finchley, and the consequent increased facilities available, the Cambridge Instrument Co., Ltd., have decided to concentrate at this factory a complete self-contained unit to deal with their increasing business in mercury-in-steel indicating and recording thermometers, vapour pressure dial thermometers, automatic temperature regulators employing these systems; and pressure dial gauges and recorders.

This organizational unit, which is termed the 'Mechanical Thermometer Division,' is complete with its own sales, correspondence, manufacturing and repair sections, and will in future deal with all enquiries regarding the types of instruments above mentioned. Correspondence relating to these Cambridge instruments should be directed, on and after April 1, 1955, to:—

Cambridge Instrument Co., Ltd.,
Mechanical Thermometer Division,
Friern Park, N. Finchley,
London, N.12.

Telephone: HILlside 5016. Telegrams: Fincamco, London, N.12.

Correspondence regarding all other types of Cambridge instruments should be directed, as hitherto, to their head office, at 13, Grosvenor Place, London, S.W.1.

Personal Notes

MR. ERIC SHIELL, Innerleithen, has succeeded Mr. L. Farquhar as Manager at Peebles.

SIR WILLIAM J. LARKE, who will be 80 on April 26, is to be the guest of honour at a luncheon organized by the Institute of Welding and the British Welding Research Association at the Hyde Park Hotel on the previous day.

MR. DOUGLAS SMITH will represent General Gas Appliances, Ltd., as from April 4, in the whole of the Northern Gas Board area, and in conjunction with MR. NORMAN L. JONES he will represent the Company in the North Eastern area.

MR. A. F. HETHERINGTON, who has now taken up his appointment as Commercial Manager to the Southern Gas Board, was given a grand send-off the other week by the Central Division of North Thames Gas Board of which he was Divisional Manager. He was presented with a cheque subscribed by members of the Division. Mr. D. H. Rouse, his former Commercial Assistant and now the Board's Western Divisional Manager, making the presentation on their behalf. Mrs. Hetherington, who accompanied her husband at the ceremony, was presented with a bouquet by Mrs. N. Dean of the Central Division staff.

MR. R. W. PARKER, at present Deputy Chairman of the North Western Division of the National Coal Board, has been appointed Chairman of the Scottish Division in succession to Dr. W. Reid who is now a Member of the National Board. MR. L. GRAHAM, Deputy Chairman of the Northern Division, is to be Chairman of that Division in succession to Mr. J. Bowman, who is now Deputy Chairman of the National Board. MR. H. W. McQ. HEMBRY, Finance Director of the Northern Division, is to be Deputy Chairman of that Division in succession to Mr. Graham. MR. A. W. JOHN, O.B.E., at present Deputy Director General of Finance at National Headquarters, is to be Director General in succession to Mr. J. Latham, C.B.E., who is now a member of the National Board.

MR. A. G. THOMPSON, a member of the British Welding Research Association staff, will be attending the intra-European Mission for the comparative study of welding techniques as a specialist in welding productivity nominated by the European Productivity Agency. MR. W. V. BINSTEAD has joined the Development Department of the British Welding Research Association. In his capacity as a development engineer, Mr. Binstead will be visiting industrial organizations where assistance is called for in connection with welding problems. The Association is expanding its development service and during the next two years, will be holding a series of lectures on 'Increased Productivity due to Welding' in many parts of the country. This programme which Mr. Binstead is organizing has been made possible as a result of American funds provided by the Department of Scientific and Industrial Research.

MR. A. O. BLUTH has joined the Board of Vickers, Ltd. Mr. Bluth is a Director of Vickers Armstrong, Ltd.; also a Director of Erlangers, Ltd., and Vice-Chairman and Joint Managing Director of the Jack Olding Organization.

LORD KERSHAW, O.B.E., has this week been appointed Chairman of the two major Companies in the Group being developed by MR. H. W. BOWEN, O.B.E., who last year took over the ownership of High-Pressure Components, Ltd. Since then, MR. BOWEN, who was formerly Managing Director of E.M.I. Factories, Ltd., has taken over Sun Engineering (Richmond), Ltd., and its subsidiary, Davies Colman, Ltd. He has also formed a merger with a leading combine in the high pressure field in the U.S.A.

MR. D. H. SHANKS, Assistant Statistics Officer, West Midlands Gas Board, has been appointed Assistant Organization and Methods Officer. Other appointments approved by the West Midlands Board are: MR. S. J. LOWE, Assistant Instrument Engineer, Divisional Laboratories, Birmingham and District; MR. R. B. HOBSON, Technical Assistant (Engineering), Stafford District; MR. G. ECCLES, Assistant Distribution Superintendent, Wolverhampton District; MR. R. ARMITT, Assistant to Sales and Service Superintendent, Wolverhampton District; MR. D. FERGUSON, First Engineering Assistant, Windsor Street Works, Birmingham District.

Obituary

MR. RONALD L. SPEARS, who joined the Birmingham Gas Department in 1891, and remained there until his retirement has died at the age of 75. He was a great chess player, competing in the Birmingham and Cooden League, and winning many prizes and county matches. In 1889 he played the world's champion, Laskar, and drew. The same year he won the gold medal for Birmingham.

MR. FRANK BEAUMONT, who, as briefly reported in the 'JOURNAL' last week, lost his life in the explosion at Retford gasworks on March 16, had been District Engineer there since July of last year. Born in 1904, he started his career in the gas industry with the Huddersfield Corporation Gas Department in 1920 at Langwood, Huddersfield, following in the footsteps of his father, the late Mr. C. Beaumont. He remained there until 1942 when, having attained the position of assistant works engineer and chief technical assistant, he left to become Engineer, Manager, and Secretary of the Meltham Urban District Council's undertaking. In 1947 he became Engineer and Manager of the Mablethorpe and Sutton Gas Company, and was appointed by the East Midlands Gas Board as Local Manager at Mablethorpe on vesting day. He was commended for his work in the East Coast floods early in 1953, when Mablethorpe suffered severe damage.

Diary

March 31.—MIDLAND JUNIORS: President's Day at Wolverhampton.

March 31.—NORTH THAMES G.C.C.: Kent Room, Caxton Hall, Westminster, 2.30 p.m.

April 1.—LONDON JUNIORS: 'Oil Gas,' W. J. Walters, 178, Edgware Road, London, W.2. 6.30 p.m.

April 2.—MANCHESTER JUNIORS: Visit to Lostock Gasworks, Preston. 'Crude Tar—Preparation for Sale,' L. V. Mayoh.

April 5.—MIDLAND JUNIORS: 'Gas Central Heating and Hot Water,' W. Walling. Birmingham.

April 5.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, S.W.1. 11 a.m.

April 9.—SCOTTISH JUNIORS (WESTERN DISTRICT): President's Day visit to Perth Gasworks.

April 14.—WALES AND MON. JUNIORS (SOUTH): Annual General Meeting. Porthcawl.

April 16.—SCOTTISH JUNIORS (EASTERN): Visit to the Dunkeld undertaking. Combined paper.

April 16.—LONDON JUNIORS: Visit to Kensal Green Works.

April 16.—YORKSHIRE JUNIORS: Address by L. W. Andrew, Director, Watson House. Leeds University.

April 19.—LONDON AND SOUTHERN SECTION, I.G.E.: 'Large Scale Carrier Gas Carbonization,' A. F. Grant and C. H. Lewis. Bishop Partridge Hall, Church House, Great Smith Street, Westminster. 2.30 p.m.

April 19.—MIDLAND JUNIORS: 'Purification,' F. Grocott. Staff Mess Room, Birmingham, 6.30 p.m.

April 20.—COKE OVEN MANAGERS' ASSOCIATION: 'Experiences in the Operation of a Collin De-Sulphurizing Plant,' T. H. Williams, Royal Victoria Station Hotel, Sheffield, 7 p.m.

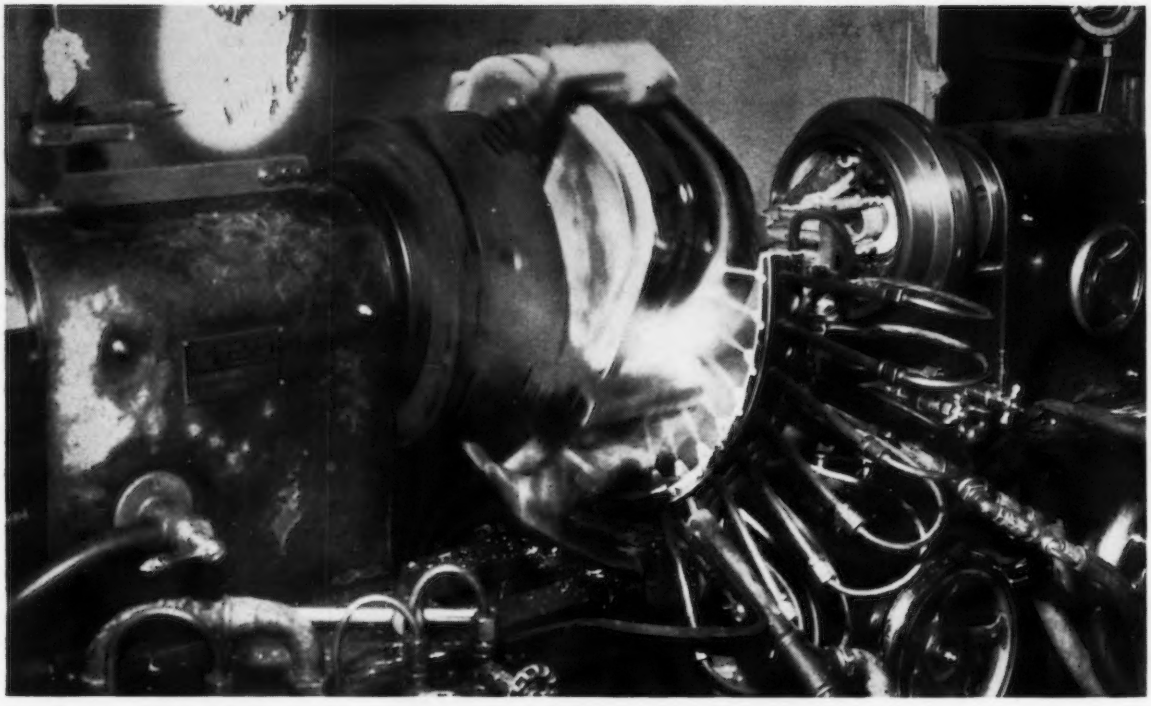
April 22.—MIDLAND SECTION, I.G.E.: Annual General Meeting, Birmingham.

April 26.—MIDLAND JUNIORS: Annual General Meeting. 'Works Locomotive Tyres,' G. E. Palmer. Birmingham.

April 27.—MANCHESTER JUNIORS: Annual Dinner, Lonyford Hall, Stretford.

Gas and Coke Appliances sold by the North Western Gas Board in February were valued at £377,642, an increase of 13% over the sales value for February, 1954 (£333,015).

Appliance sales in the first eleven months of the Board's current financial year (April, 1954—February, 1955) were valued at £4,330,922 and were up by 15% compared with sales in the same period of the previous year.



Television sets; a cathode tube is spun in the lathe while oxy-coal-gas flames are fusing the face to the cone.

Gas and Modern Production*

By A. E. TYRRELL,
Chief Industrial Representative, North Thames Gas Board.

THE object of this paper is to show how an industrial gas service is helping modern industry by its contribution to faster methods of production, to the higher standards required by a more exacting market, and to the ever-increasing volume of production required by the vital export markets. It keeps pace with modern developments and adapts itself to the changing pattern of production. It is upon progressive and efficient industrial services that industry largely depends to fulfil the demands made upon it, and by no means the least important of these is that provided by the industrial gas departments of the gas industry.

The Industrial Gas Turbine

The application of the gas turbine to power production was under consideration for many years before the war, but in Great Britain the work of an independent young engineer in combining the gas turbine with aircraft jet propulsion, coupled with the war-time necessity for faster and faster aircraft was largely responsible for the strides in gas turbine technology during the past 15 years. Briefly, a gas turbine unit consists of three essential components: (1) A rotary air compressor at the front; (2) combustion system into which kerosene is sprayed and burnt continuously; and (3) a turbine revolving with the compressor on a common shaft. There are no pistons, valves or ignition apparatus, save for two igniter plugs to obtain a start. Starting operations are automatically controlled by a time switch.

Turbine blades may be forged, machined, pressed, or cast. An investment casting process, sometimes referred to as the lost wax process, is practised in one of the largest foundries of its kind in the country. Investment casting is carried out in four main stages: (1) The construction of a metal die of the part to be cast; (2) the forming of expendable wax patterns from the die; (3) the construction of refractory moulds from the wax patterns; and (4) the pouring of metal into the moulds.

The die-making stage completed, production of the castings begins with the making of the expendable wax patterns. An injection machine automatically feeds the correct amount of wax into the die, a clamp holding the die until the wax is cool enough to be handled, when it is removed from the pattern by the operator. One wax replica is needed for every casting required. It is one of the advantages claimed for the process that the dies are of soft metal, and dealing only with a low temperature wax pattern will make many thousands of such patterns without risk of damage or distortion. The dimensional accuracy of the pattern is checked and any surface blemishes removed. Wax runners are attached to the base of the pattern. The assembly is weighed and from this the weight of casting metal required is ascertained.

The next stage is to form a mould around the pattern called 'investing.' The melting of the wax pattern from the mould is accomplished in a gas-fired convector-type oven employing air circulation principles to ensure a low temperature gradient, the oven temperature (about 130°F.) being slightly above the melting point of the wax.

Fig. 1 gives details of the preheating oven, which is 16 ft. long and 4 ft. 6 in. wide, and has a gas rate of 600 cu.ft. per hour. At this stage the canister is dispensed with, the mould being strong enough for the next operation without support. The firing of the mould, carried out in a gas-fired tunnel

* From a paper read before the Institution of Engineers-in-Charge, March 9, 1955.

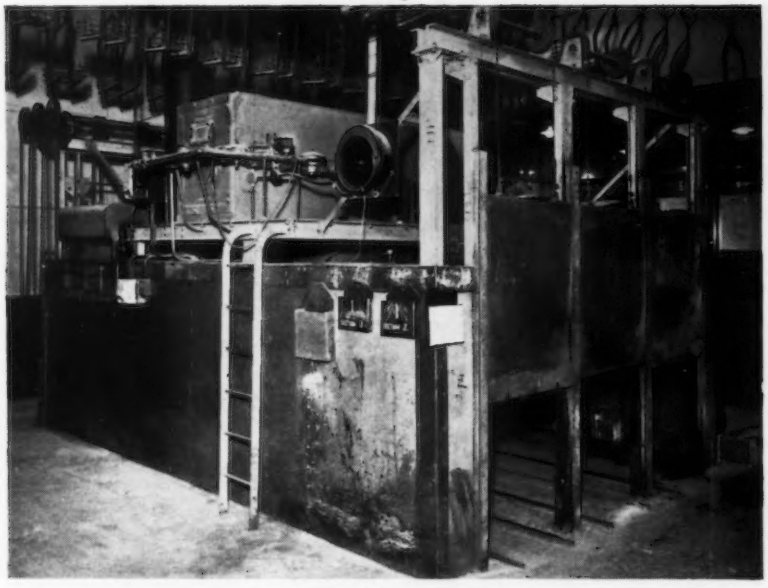


Fig. 1. Manufacture of turbine blades; preheating oven for the removal of wax from the refractory mould.

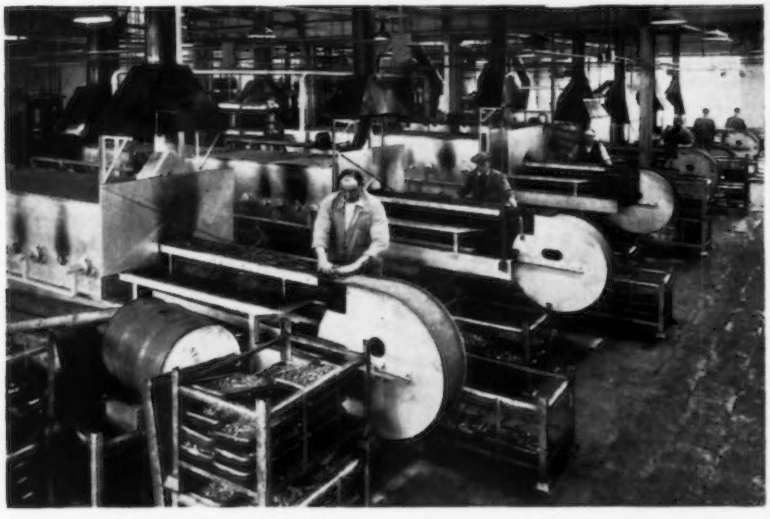


Fig. 2. The 'feed' end of furnaces in bolt manufacture; the bolts are being fed on to a conveyor.

furnace, increases the permeability of the refractory, so allowing the gases given off by the metal during casting to escape. The principal purpose of the operation is, however, progressively to raise the temperature of the mould to about 1,000°C. along the length of the furnace, preparatory to casting. The hot gases from the combustion zone are drawn along the furnace towards the point of entry before being discharged, thereby ensuring maximum preheating for the travelling stock. The furnace is 36 ft. long and 6 ft. wide, the gas rate being 1,800 cu.ft. per hour.

The burner equipment is designed for gas at 2.5 in. pressure and air at 25 in. being raised by a single stage fan. The number of moulds that can be dealt with is 16 per hour. The total time spent in the furnace is 40 hours. Temperatures are automatically indicated and recorded at five different points and control is at the highest point.

The problems associated with the development of gas turbines for both aircraft and industrial purposes have been many and involved, and have meant metallurgical and mechanical research in completely new fields. Although much has been achieved, much more remains to be done. Efficiencies still remain comparatively low. To improve efficiencies substantially, we need to have higher and higher temperatures, and the problems of suitable materials and longer periods of service thereby become more acute. Cheaper fuels, such as the heavier oils or even solid fuel, are under active investigation. There are good prospects that these and many other problems will be solved and we shall find the gas turbine taking its place as one of the most important developments, providing power for modern industry and transport. Town gas supply is used at some stage in the making of almost every component involving 22 different heat treatment processes.

Radio and Television

Town gas supply fits into many electrical processes and plants employed in the radio and television industry. Normally the glass shell or envelope of the cathode-ray tube is made in three parts, the face of the screen, the cone, and the neck, all in lead glass. The first task is the fabrication of these three parts to form the glass envelope, and this is accomplished by setting up the neck and the cone in a double lathe, both sections of which are synchronized. The neck is flanged at one end.

The turning glass is preheated by lambent flames for about three minutes, and then in the presence of oxy-coal-gas flames the neck and cone are fused together after the cone has been shaped to accept the flange. Lambent flames are again allowed to play on the glass while the face is inserted in the lathe, this also being preheated by the same means. After three minutes preheating, the more delicate operation of joining the face begins. The size of the joint, the fact that it is rectangular in shape, the glass at this point being about ¼ in. thick, and the need to keep fusion to the smallest area, calls for high flame temperature over a narrow section of the glass, on either side of the parts to be joined, and necessitates the use of oxygen in conjunction with the gas supply.

Our titleblock shows the process at the moment of fusion, also the ring of burners surrounding the tube. Other burners are providing general heat to prevent steep temperature gradients in the glass that would inevitably lead to cracking or shattering. The oxy-coal-gas flames are extinguished immediately the joint is complete, while large lambent flames continue to envelop the glass in order to lower the temperature gradually. Still at about 300°C. the glass is removed from the lathe and placed on the conveyor of an adjacent gas-fired annealing lehr. Passage through the lehr, 70 ft. long, takes three hours. It is divided into three zones, the first maintained at 495°C., the second at 465°C. and the third at 425°C. At the end of the lehr comes a cooling section 50 ft. long, at the end of which the glassware is cool enough to be handled. The purpose of the lehr is to remove the stresses created by the fabrication processes.

Exhausting of the tubes is done in the presence of temperatures in the range 400-450°C., which help to scour thermally and release gases or foreign matter from the glass, which are then pumped away. The tube is sealed off by heating in an air/gas burner, and the cathode-ray tube now under high vacuum is ready for an exhaustive series of tests, but for one further operation.

Processing of valves varies little from one manufacturer to another, although the basic heat processes are always similar.

CONSULT

WOODALL-DUCKHAM

ON YOUR GASMAKING PROBLEMS

PLANTS AVAILABLE FOR . . .

CARBONISATION OF COAL

W-D Continuous Vertical Retorts
W-D Intermittent Vertical Chambers
W-D Coke Ovens

COMPLETE GASIFICATION OF COAL

W-D/IFE Complete Gasification Plant
(Gas Integrale System)

GASIFICATION OF LIQUID HYDROCARBON OILS

W-D/GASMACO processes including Hall Process of American Gas Association

REFORMING OF GASEOUS HYDROCARBONS

W-D/KOPPERS-HASCHE Reforming Plant

WOODALL-DUCKHAM CONSTRUCTION COMPANY LTD.
Woodall-Duckham House, 63-77 Brompton Road, London, S.W.3
Telephone: KENsington 6355 (10 lines) Telegrams: Retortical (Southkens) London

W-D

colour choice that sells

The Renown Five Gas Cooker is now available in WHITE or CREAM with choice of colcured taps in Signal Red, Light Green or Cambridge Blue.

The ONLY cooker with all these features—

- **Every burner is self-lighting.**
- **Largest eye-level twin grill.**
- **Turkey-size oven with self-lighting burners.**
- **Easy to clean if spillage occurs.**
- **Large warming drawer.**

Perfection in styling.

PARKINSON
RENOWN
FIVE

THE PARKINSON STOVE CO. LTD., BIRMINGHAM (*A member of the Parkinson & Cowan Group*) **Makers of the famous 'LIVE WATER' WASHING MACHINE & PARAGON Gas Cookers**

For example, the valve is moved through the preheating stages until fused, and then comes the final stage for controlled cooling. In some an aluminium pellet is heated and sublimed to remove the last traces of air or foreign substances in the last-but-two stages which remain for the fusing off of the tubular connected to the pumping machine. This removes entirely the risk associated with manual means of performing a delicate final operation.

When Sir Ambrose Fleming developed the first thermionic valve he could not possibly have foreseen to what it would lead, or the logical next step that followed, and who can tell where we shall go next. The technical excellence of these electrical devices, and their economic production by industry is made possible only by the aid of a constant quality, flexible form of heat, controllable to close limits over a wide range of temperatures, so suitably provided by town gas supply.

Manufacture of Nuts and Bolts

The manufacture of nuts and bolts provides many complex production problems, important among which is that of the heat processes. Automatic control over a wide range of temperatures through gas furnaces reduces labour problems, and improves both quality and quantity of production. It does this in minimum space and with the greatest economy. Gas may be proud of its past in this industry and confident of its future in providing yet greater volumes of high standard products.

In the heat treatment processes involved in bolt manufacture certain features in the plant are very desirable. First, control of temperature. Then comes uniformity of heating, control of furnace conditions to give scale free work, and low operating costs. Automatic application of these features with a variable speed conveyor for different operations and materials have been embodied in the design of the seven furnaces shown in Fig. 2. Additional advantages of having furnaces alike are standardization of parts and controls, and adaptability for the various processes, although it is better that each furnace should, so far as possible, be kept to the same process. These furnaces are normalizing, stress relieving or annealing between cold operations, hardening and tempering. Automatic quenching takes place at the discharge end of the furnace. Designed on semi-muffle principles, the heating is done by air blast tunnel-type gas burners with automatic proportioning.

High standard and economic production requires careful attention to the making of suitable tools. Wire drawing, cold and hot heading, thread rolling and trimming all depend equally upon tools skilfully made to very close tolerances from materials sometimes difficult to handle.

Newspaper Production

The foundry is the heart of a newspaper printing house. An entirely new foundry has recently been completed having cream tiles and ceiling painted to match, and is perhaps one of the most spacious of its kind in the country. It is approximately 56 ft. by 78 ft. and is 18 ft. below street level and has a ceiling height of 16 ft. Air conditioning is a feature of the new foundry. The foundry equipment includes two 7½ ton automatic auto-plate casting machines and three 7½ ton junior machines. The casting machines and the melting furnaces are in one unit; each automatic machine is capable of casting four stereo plates per minute continuously, whilst each junior machine casts two each minute, each plate weighing 65 lb. with the tail. The matrix from which these plates are cast is about 0.3 in. thick.

The construction of the furnace includes a cast iron pot 1 in. in thickness and oval in shape, the dimensions being 5 ft. 6 in. long, 3 ft. 4 in. wide and 2 ft. deep. The furnace is lined with 4½ in. thick refractory brickwork, the outer case being in mild steel with a planished finish. A brick baffle is built into the furnace space in order to give maximum travel to the hot gases before they are discharged. The pot is divided by means of a weir arrangement which goes deep into the metal and provides the means for pumping dross free stereo metal into the casting machine. The operating temperature is kept at 580°F. and a non-oxidizing atmosphere is maintained and distributed over the surface of the metal to reduce dross formation to a minimum. The burner system is of the air blast tunnel type, fitted in a removable block, firing at one end on to a bed of broken refractory. Automatic proportioning devices are provided for ease of control. A zero governor is fitted on the system with an adjustable governor on the pilot burners.

A two-stage high-speed fan provides air for the burners and is direct driven by a 3 H.P. motor. A low pressure cut off valve and non return valve are incorporated in the gas supply, while thermometers of the mercury in steel type, with a dial indicator, are fitted for temperature measurement. In Fig. 3 a furnace can be seen in an early stage of assembly, while Fig. 4 shows it at a somewhat more advanced stage of completion. Other foundry equipment includes a routing machine which is used mainly for colour plates. The used plates are sent back to the foundry from the press room on the conveyors which are reversible, but just before reaching the foundry they are picked

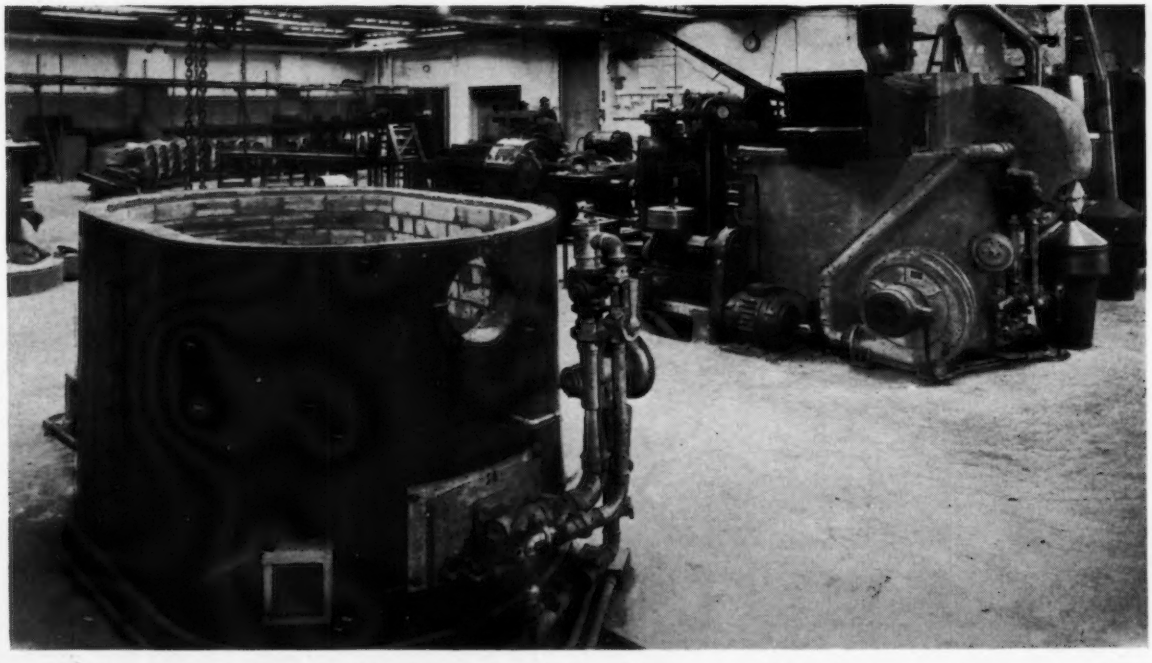


Fig. 3. Newspaper production; the brick-lined casing of the melting furnace ready for the burner equipment and metal pot.

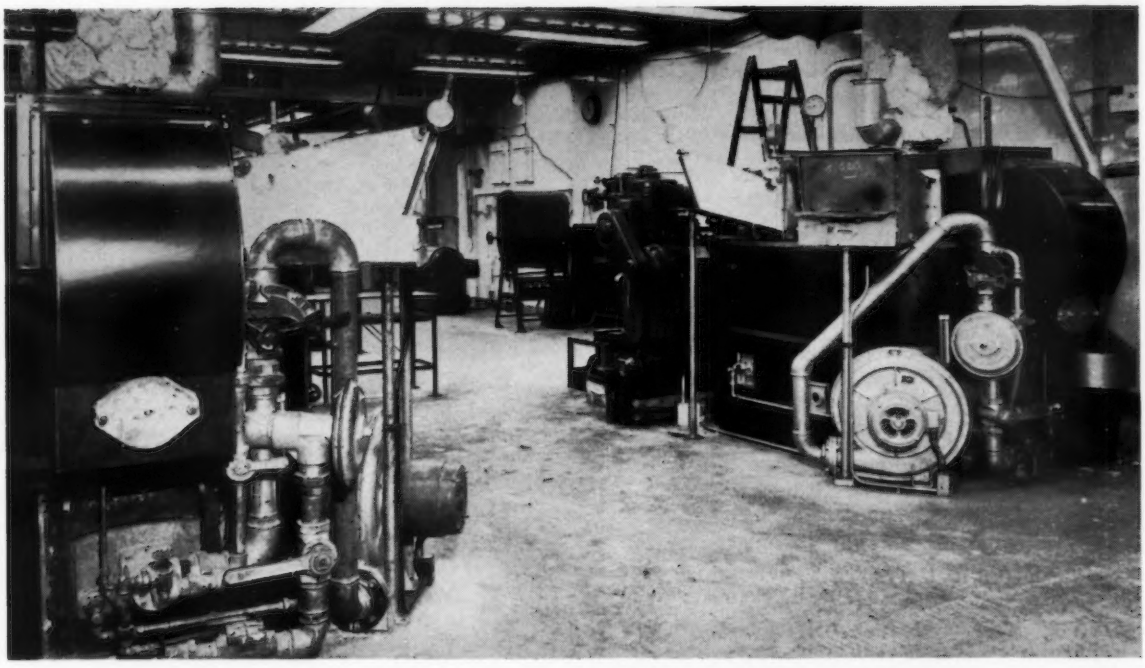


Fig. 4. Newspaper production; melting furnace with steel outer casing awaiting the completion of the ventilation equipment.

up by two special machines. These convey the plates to a platform at a convenient height for loading on to trucks, on which they are taken, first to storage bays and then as needed to the rear of the casting machines to be melted down and used over again. It is calculated that about half a million page stereo plates are cast in this foundry each year. A great deal of the type metal is also reclaimed and large re-melting furnaces of capacities up to two tons are used for this purpose, the metal being cast into ingots.

The maintenance of the correct conditions within the building is important to the paper and many of the processes; this is achieved by fully automatic gas fired boilers, examples of which can be seen in Fig. 5. The saving of space and labour are perhaps more important here than in other industries.

Apart from the foundry and the remelting furnaces, gas is used in 10 processes and its flexibility and infinite range of control and reliability makes it particularly suitable for the fast moving production requirements of a newspaper.

The Processing of Food

Of all the gas used by industry in the North Thames area of supply about 20% is used for the production of food and food products. In bread baking the mixing of the dough by the addition of water, accurate in quantity and temperature,

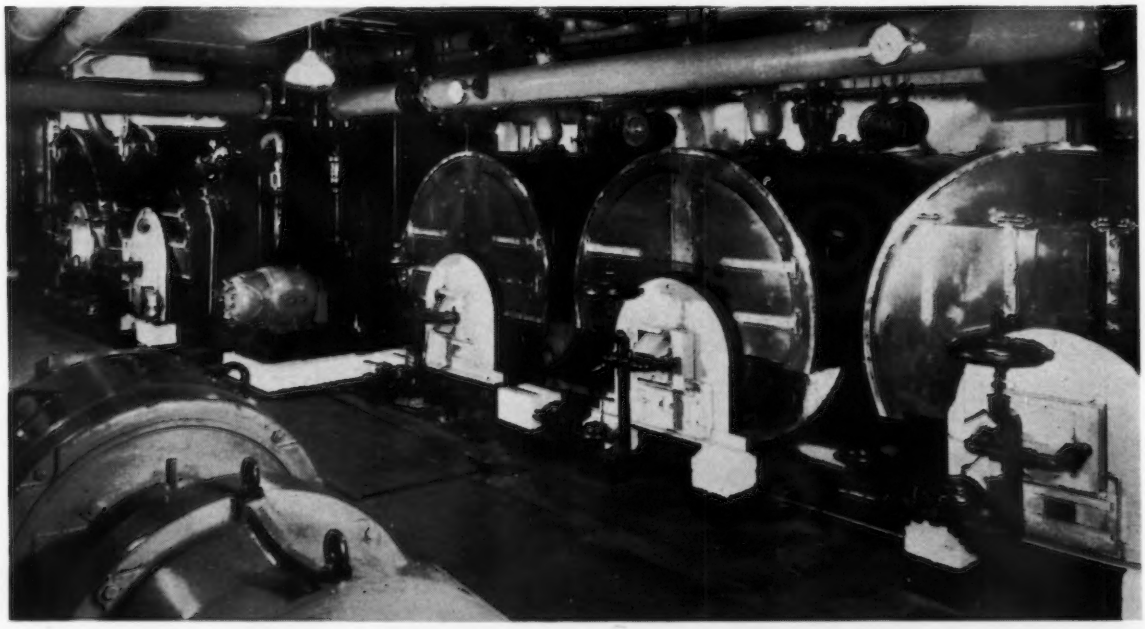


Fig. 5. Newspaper production; two of these boilers provide 2,000 lb. of steam per hour each. The other three, operating at 170°F., provide hot water, each having a rating of 1¼ mill. B.Th.U. per hour.

Fig. 6. Food processing; hygienic conditions are of such a high standard that it is possible to use the oven in the shop.

is provided by gas heated apparatus and the subsequent proving of the dough, under conditions of strict temperature control, is necessary for it to reach the oven in good condition. The oven should be at the baking temperature of about 500°F. to bake off the goods as they reach the oven mouth. With automatic plant having a moving belt or swinging trays,

Fig. 7. Food processing; the oven here can be seen through a specially constructed glass panel. The goods can be passed straight into the shop through the serving hatch.

when the dough pieces reach the other end of the oven, or the tray has gone the full cycle of the oven, usually in about 30 minutes, they will have about doubled in size and changed colour to a shining golden brown. An oven of the conveyor type is capable of dealing with 1,320 2 lb. loaves every hour. An 8 ft. by 6 ft. double deck oven will produce 216 2 lb. loaves per hour. In the larger tunnel type conveyor ovens up to 2,600 2 lb. loaves per hour can be produced.

A combination of a more discriminating buying public and the progress made in plant design has made possible the trend towards baking in sight of the customer. In Figs. 6 and 7 4-deck ovens are seen as they appear to the customer on entering the shop. Both ovens, apart from baking bread, also deal with a wide variety of confectionery. Each oven is fitted with automatic temperature control to each deck and a dial type thermometer indicates the temperature for each deck. A constant pressure governor on the gas supply stabilizes any fluctuation in fuel supply due to pressure change, and a lighting torch and pressure safeguard valve combines ease with safety in operating the plant. The required operating conditions over the full range of the plant up to 550°F. may be maintained within 5°F. The fuel costs are less than 2% of the retail costs of the goods produced.

In addition to hot water for dough mixing and for the conditioning of the fermentation rooms, the baker needs some steam on the ovens. This is fed into the oven at the correct stage of baking in a saturated condition, and the familiar shining bloom on the bread is produced as a result.

The Manufacture of Ice Cream and Wafer Biscuits

Plant for the heating processes in ice cream manufacture can be directly heated by suitable gas equipment, or indirectly by means of a water or steam jacket. During the heating it is important to keep the mixture in a state of agitation to prevent the formation of surface skins, and to ensure uniform heating without risk of burning. When steam is used, a small gas fired boiler can be used, the steam being available for the sterilizing of the plant as well as the heating. A small installation of this kind is shown in Fig. 8. This plant can handle over 50,000 gal. per year. When the mixture has cooled, it is solidified in ice boxes or chambers to 21°F. to cut up into suitable size blocks, or to 27°F. for serving directly from the container into dishes or with wafer biscuits or cones.

Biscuit wafers are made by drip feeding a batter on to plates of a book type hotplate. Each oven has an endlessly

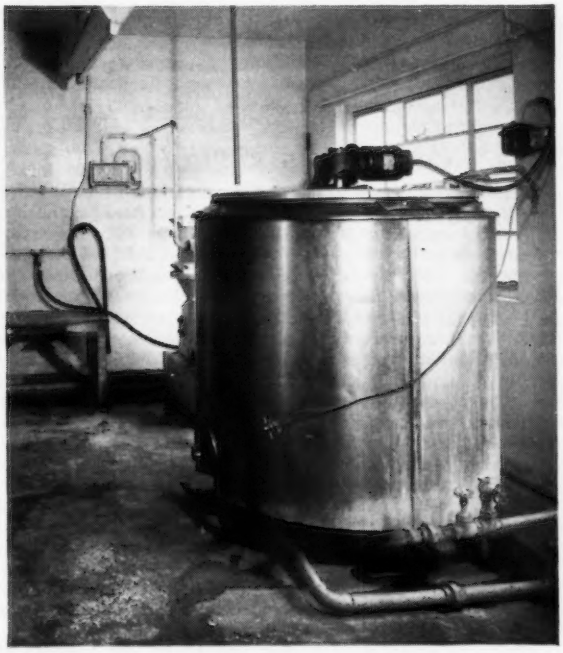


Fig. 8. This pasteurizer is fitted with a mechanical agitator and is heated by steam provided by a horizontal gas-fired boiler; capacity of the plant is over 50,000 gal. per year.

Fig. 9. Ham cooking appliances ready for a load. On right can be seen a gas-operated storage appliance for hot water.

revolving band of 18 of these hotplates. The hotplate travels through the oven and returns to the filling station in about two minutes, the batter having become a sheet of 30 wafers which are removed by the operator for the cycle to be repeated. One battery of these machines has a combined weekly output of about 6 mill. wafers. The operating temperature is 450°F. and the gas rate of each oven is 850 cu.ft. per hour.

Preparation of Hams

The cooking of hams on a large scale calls for close process control combined with economic operation, for while a specialized sphere, it is nevertheless most competitive.

Two appliances heated by immersion tubes and each having a capacity of 100 boned hams, each weighing approximately 11 lb. boned, are shown in Fig. 9. The hams are enclosed in special presses to give shape and minimize loss, and after loading into cold water the operation of the plant begins with the lid open. Temperatures are taken during heating up and when the contents reach 180°F., in about 1½ hours, the gas burners are turned off and the insulated lid is clamped down. The cooking process now continues on a falling temperature and is completed in about nine hours. The downward temperature gradient is small because of the effectiveness of the insulation which is applied to all exposed surfaces of the plant, including the bottom. The gas consumption for 200 hams is 1.22 cu.ft. per lb. of ham cooked, or 0.0001% of the retail cost of the ham.

The internal dimensions of the plant are 92 in. long by 42 in. wide by 34 in. deep and the container is made of monel metal surrounded by a sheet steel outer casing supported by angle iron framework, the insulation being mineral compound. Tubular heating burners consist of post-aerated jets firing horizontally into a combustion chamber, the hot gases being drawn through three 3 in. tubes V-shaped horizontally by an extract fan which finally discharges the spent products into a flue duct. Combustion safeguard equipment makes use simple and safe.

COAL INDUSTRY HOUSING

The Coal Industry Housing Association started work in April, 1952, in which year the National Coal Board authorized £37 mill. for the Association's programme. It was recognized that the capital cost to the Board would be heavy, but it was felt that only action of that kind could attract men to the places where they were needed. The total programme was to build 19,781 houses. The number so far completed—less than three years after the organization started work—is 18,045. The remainder, except 450 on two sites which have yet to be acquired, should be finished next month. There are 93 sites and only 15 (four in the East Midlands, eight in Yorkshire, and three in the West Midlands) are still incomplete. During 1954 alone, 12,019 houses were completed. Forty-eight shops and 630 garages are being built on the estates in response to local demands, and let at economic rents. The Housing Association's total staff, which has at no time exceeded 12, is now eight. The General Manager, Mr. Miles Hudson, F.R.I.C.S., was seconded from the Ministry of Housing and Local Government, where he had been Principal Surveyor. Twenty-seven firms of architects and 22 quantity surveyors in private practice were appointed by the Association.

Owing to shortage of labour and bricks, the building of traditional houses could not be considered and eight of the most successful types of 'new traditional' houses, approved by the Ministry of Housing, were selected. The advantages included the use of standardized plans and of regional prices agreed by the Ministry with the sponsors of each type. The largest estate, Bolton on Dearne, has 692 houses. The smallest is at Carcroft, also in Yorkshire, where the Board owned a plot which has accommodated four houses. The average number is slightly more than 200. Types of modern heating and cooking appliances approved by the Coal Utilization Council have been installed. Special attention has also been given to providing adequate insulation in the roof space as well as to the walls and floors. Weather stripping of the front and back doors has also been provided. In June, 1953, the total average cost of a house was estimated at £1,900, comprising £1,550 for the house, £250 for roads, sewers and services, and £100 for land, development charges, professional fees, clerks of works' salaries and general expenses. A recent review has shown that the average cost will be less than the approved estimate, although, since the time when it was made, there have been wage increases and slight increases in the price of other materials, except timber, which has tended to fall. There will be a loss to the Board of up to £50 a year on each house.

According to Major General Sir Cecil Smith, who is in charge of industrial civil defence training at Hobart House, the National Coal Board has trained, or has under training, 20,000 miners in civil defence work. Sir Cecil has been visiting the Scottish Division.

Iron Bacteria in Gasholder Water*

By A. R. MITCHELL, Assoc.M.Inst.Gas E.†

DISCOLORATION of gasholders, due to the formation of iron bacteria, is not new nor has it suddenly developed, but is something that has always been there to some degree and until recently has had little consequence. In the past, gasholders were painted very frequently, often annually and in some cases with tar. This has resulted in brown deposits being disregarded and covered over, since it was usually thought that it was rust and therefore normal.

With the increased cost of labour and paint, and disinclination to use tar from the aesthetic point of view (as a tarred gasholder does not enhance the appearance of a gasworks, much less a district holder), the painting of gasholders has been reduced to a minimum. This, therefore, requires that anything which discolours the paint should be prevented, if possible, or removed from the paint, thus eliminating the necessity for too-frequent painting.

A holder which has been painted will, if conditions suit the growth of iron bacteria, be completely covered with a brown deposit in a few months, especially on the sheets which are frequently submerged and raised. This deposit is cumulative and varies from a light fawn to a dark brown in colour. If these bacteria could be eliminated or prevented from discolouring the paint, a considerable reduction in painting costs would result, especially with district holders.

Forms, Identification and Growth

The growth of these organisms in water leads to the accumulation of slimy ochre-coloured deposits, or floating particles of ferric hydroxide. These are usually most troublesome in district gasholders on account of the cleaner, less bactericidal conditions prevailing, than in a holder in a gasworks. These floating particles consist of the remains of the bacteria and their mucilaginous sheath, in which are contained large quantities of iron in the form of ferric hydroxide. The bacteria have the power of abstracting iron, either from the water itself or from the surfaces and pipes with which they come into contact.

Ferruginous waters are invariably found to contain iron bacteria. It is not uncommon to find iron bacteria in water containing less than 0.1 parts per mill. of iron. These bacteria can and do survive in water containing much less than this, in a dormant form; possibly as spores which begin to grow and multiply as soon as conditions suit. The abstraction, oxidation and storage of iron by these bacteria is a continuous process, and consequently there occurs very quickly a large accumulation of ferric hydroxide. Most of these bacteria take up manganese as readily as iron. The presence of organic matter in a water is essential for their growth and carbon dioxide gives them added encouragement.

The presence of iron bacteria in water is indicated by the appearance of slimy ochre-coloured streamers or deposits and may be confirmed by miscroscopical examination. There are various closely allied organisms included under the name of iron bacteria, among these are:—

(1) Leptothrix ochracea.
(2) Gallionella ferruginse.
(3) Spirophyllum ferrugineum.
(4) Crenothrix polyspora also known as crenothrix manganifera (when it contains manganese instead of iron).
(5) Gladothrix dichotoma.
(6) Clonothrix fusca.

A marked characteristic of iron bacteria is the fact that one and the same organisms may assume a number of different forms and this has led to much confusion and difficulty in identification. Fortunately, however, it generally suffices for the purpose of the gas engineer to establish the presence of iron bacteria without attempting to determine the particular species.

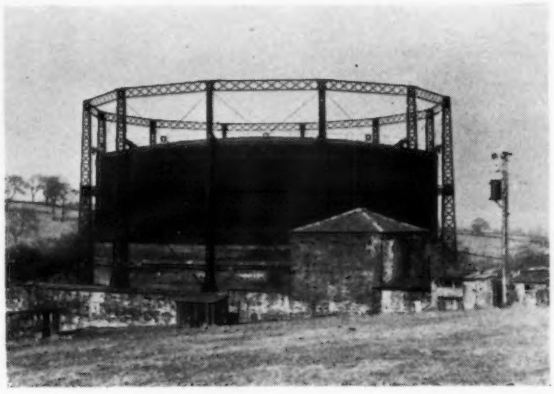


Fig. 1. District holder with one lift badly stained by bacteria.

Roughly they consist of a sheath of ferric hydroxide about 2μ in diameter and 200μ in length, although some may attain a length of 3 mm. From my own observation of them in gasholder water, the lengths vary from 20μ to 100μ. They do, however, tend to join together and form large particles rather like snow crystals. When examined under a microscope they may be likened to a test tube filled with a single row of marbles. The particular conditions that are required to give rise to their sudden and abnormal multiplication are obscure but they could not occur in the absence of organic matter, which is a necessary food. The threads sometimes attach themselves to foreign objects such as the side of the holder or the tank, but they are also found in large numbers floating in the water.

Multiplication occurs in two ways; firstly by the cells becoming detached due to a rupture of the sheath and secondly, by spores thrown off from the end of the sheath. In both ways it is exceedingly rapid and continuous. To confirm identification, a specimen should be examined in the untreated state and again after treatment with diluted hydrochloric acid which removes the iron sheath and leaves the cells. It is interesting to note that in the right place iron bacteria are useful to the gas industry. These are the bacteria responsible for the deposition of iron on to peat that forms the well-known "bog ore" used for purification. It is usually leptothrix ochracea that is responsible for this.

Some forms, especially gallionella, grow predominately in the absence of light as in pipes and mains, whereas crenothrix prefers light. It must be pointed out, however, that as with other types of bacteria, they adapt themselves to circumstances and often lie dormant for a considerable period until conditions suit, when they begin to multiply in great numbers. As an example of the work of these bacteria, a sample of holder water was taken from inside the crown, immediately after opening up for repairs. It was found to contain 0.0019% iron, which was about normal for an old gasholder. A sample of the water was then placed in bright sunlight for a number of days. The bacteria immediately began to grow, the water became cloudy and a gelatinous mass settled at the bottom.

The water was filtered and the iron in the residue determined as a percentage of the holder water as follows:—

Iron as Fe 0.0013%
Iron as $Fe(OH)_3$ 0.0025%.

This is equivalent to 2.5 lb. of ferric hydroxide per 10,000 gal. from water originally containing 3.75 lb. per 10,000 gal. As 1 lb. of gelatinous ferric hydroxide occupies approximately

* From a short paper presented to the Yorkshire Junior Gas Association on March 12, 1955.

† Assistant Works Manager, Birkshall Works, Bradford Group, North Eastern Gas Board.

Fig. 2. Works holder with two lifts stained by bacteria.

9 cu.ft. as formed by the bacteria, it will be seen how easily the paint on a holder can be covered.

In a gasholder tank most of the iron bacteria are found in the top 6 ft. of the water, at all points where the light reaches the water, i.e., between the lifts and between the outer lift and the tank. Below 6 ft. the growths are very small and the water appears relatively clear. The sheaths of the bacteria are found floating in the water and, while it does grow much larger and settles to the bottom, under suitable conditions it does not do so to any great extent in a holder tank. It has been found that in a gasholder tank the particles behave in a similar manner to a colloidal precipitate. Further reference will be made to this later. When a holder rises, it carries with it a film of water which contains iron bacteria sheaths in suspension. As the water dries, the ferric hydroxide is left and this forms, in time, a hard shell-like deposit.

Methods of Dealing with Iron Bacteria

There are a number of possible methods of dealing with the problem of iron bacteria, some totally impracticable and some relatively simple to apply. Unfortunately, to date, no one solution appears to be a definite answer to the difficulty. The methods that have been investigated are as follows:—

(1) Removal of all iron from the water.
(2) Killing or inhibiting the growth of iron bacteria.
(3) Removal of the suspended ferric hydroxide sheaths from the water.
(4) Using paint that does not become coated with the suspended ferric hydroxide.
(5) Removal of the ferric hydroxide deposit without damage to the paint.

A brief account of the above lines of investigation follows.

Removal of all iron from the water

From earlier remarks on iron bacteria, it will be noted that they can survive in waters with extremely low concentration of iron and to keep the iron content of gasholder water to anything like the required figure is out of the question due to cost. The Zeolite process would have to be used which requires continual circulation of the water. The salt content of the water would rise with a corresponding increase in the corrosive action.

Killing or inhibiting the growth of iron bacteria by means of a bactericide

Before dealing with this, it is worth looking into the factors concerning the use of a bactericide in a gasholder. The volume of water to be treated is very great, approximately, 4,500,000 gal. in a 3 mill. cu.ft. gasholder. If a bactericide, to be effective, has to be used at a strength of 50 parts per mill., 225 gal. will be required. As most commercial bactericides cost at least £1 and up to £5 per gal. or more, the cost makes their use prohibitive.

The conditions that a bactericide must fulfil for this purpose are: (1) low cost, (2) no corrosive effect on the iron work, (3) non-volatile, (4) not to be absorbed and so lost from solution, (5) must not damage or discolour the paint.

One of the first chemicals to be tried was crude naphthalene. This conformed with all the conditions except non-volatility. A concentration of approximately five parts per mill. can be obtained in holder water by passing it over a filter bed of crude naphthalene crystals. This proved successful for a short period, but the bacteria became acclimatised and commenced to grow as quickly as before. Various dyes were tried without success. These included acriflavine and the much cheaper similar dye named 914, produced by Imperial Chemical Industries, Ltd.; this is very helpful in eliminating H_2S—producing bacteria. Cresols and water soluble tar acids were tried with little success. Pyridene chloride proved very successful but, owing to the now large demand for pyridene by manufacturers of certain drugs, the price is prohibitive. Sodium pentachlorophenate reacted with the iron present and formed the almost insoluble ferric pentachlorophenate which, while a relatively good bactericide, was not present in solution (due to insolubility), in large enough quantities to kill the bacteria. Other chlorophenates were unsatisfactory due to their insolubility. The colloidal forms were also tried without success. Chlorination was considered, but this is unsuitable for tanks with exposed surfaces due to excessive losses from solution and its very corrosive action.

From the foregoing it will be seen that no successful bactericide has been found as yet and it seems unlikely that one will be available at the price required. The growth of iron bacteria may be inhibited by raising the pH of the water up to pH 7.5 or higher. This can be accomplished by the addition of sodium hydroxide. When this is done there is a definite reduction in the growth of the iron bacteria and thus a reduction in the speed of the formation of a deposit.

One important point was noted, however, that certain bactericides produced a precipitation of the ferric hydroxide sheaths. When this was investigated it was found to be due to physical aggregation and flocculation of the ferric hydroxide sheaths by the addition, in some instances of a colloid (as a bactericide) of opposite polarity to colloidal ferric hydroxide and, in others, to the bactericide acting as an electrolyte.

Removal of suspended ferric hydroxide sheaths from the water

Filtering would seem to be the most obvious method of achieving this but, in practice, as the particles are gelatinous they would choke up any filtering system except a centrifuge which is unsuitable in this case. Also continual pumping would be an uneconomical proposition. A characteristic of

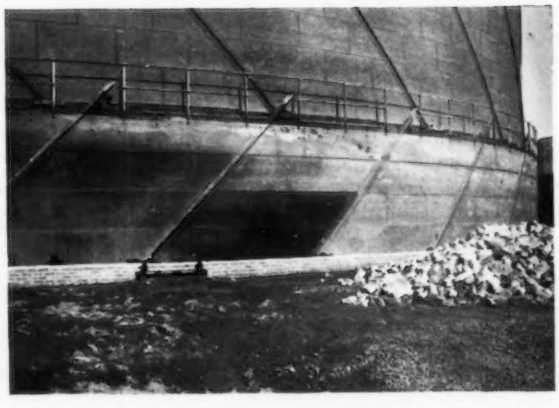


Fig. 3. Close-up of holder showing cleaned patch on right.

colloidal particles is that they are deposited from a solution by various means as has already been mentioned, that is, by the addition of a colloid carrying an opposite electric charge, by the addition of an electrolyte, and also by direct electrical means. As the particles are in colloidal suspension, these methods of removal were investigated. The use of an electrolyte appeared to be most suitable, especially if an alkaline chemical could be used.

Among the electrolytes tried were copper sulphate, ammonia and sodium hydroxide. The latter was considered to be satisfactory from most points. Copper sulphate proved satisfactory, but it would tend to decrease the pH and it might encourage sulphur bacteria. The precipitating action of an electrolyte differs according to whether it is added all at once or in small quantities, or even if added in too large

quantities. From small scale tests, 20 parts per mill. of sodium hydroxide precipitated on a rough microscopic count 95% of the ferric hydroxide sheaths. On a large scale test this was confirmed. To obtain the maximum effectiveness of the precipitating action of the sodium hydroxide it was added in a 10% solution and distributed around the periphery of the holder over a period of six days. The holder was inflated at the time of adding the solution.

The total iron content of the water was reduced from 80 parts per mill. to below 20 parts per mill. at the end of six days. (That is below measurement by the methods available.) At the same time the pH of the water was raised from 6.6 to 7.0. A further addition of 20 parts per mill. was added to increase the pH to 7.5. After six months the iron content was still below 20 parts per mill., indicating that once the iron is removed from the water and the pH raised, its return is very slow.

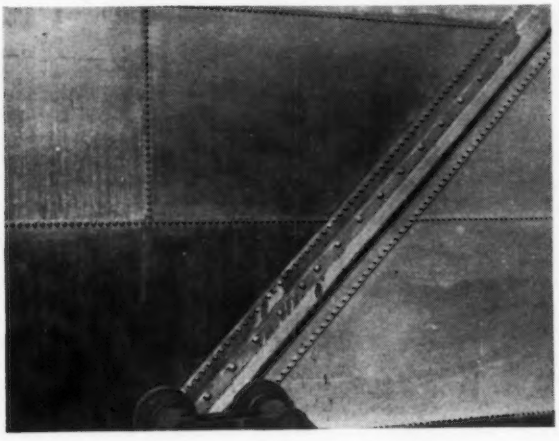


Fig. 4. Close-up showing part cleaned with rust remover beside the cleaned sheets.

Use of a paint that does not become coated with the suspended ferric hydroxide deposits.

While carrying out the above experiments, it was noted that certain paints were not covered with the deposit while others on the same holder were. This may be because (a) they contain a substance which keeps them slightly positively charged (a negative charge would attract the particles), or (b) that due to the surface or finish they do not carry with them a film of water containing the particles when the holder rises. Experiments are proceeding to see if the above phenomena can be used to eliminate the deposit.

Removal of the ferric hydroxide deposit without damage to the paint.

This can be done relatively cheaply compared with the cost of repainting a holder. As the deposit consists of ferric hydroxide, it may be dissolved in phosphoric acid. By using a proprietary phosphoric acid rust remover and preventer this may be done quite easily. The solution may either be sprayed on or brushed. Two applications may be required if the deposit is very thick or if the surface has grease on it.

Conclusions

When the author first began looking for a solution to this problem, he had expected to find it in a bactericide which could be added at convenient intervals. Up to the present this has not been found. However, from the results of the investigation so far, means of increasing the time between re-painting of a holder and still keeping its appearance have been found. These are:—

(1) Removing the particles from the water.
(2) Inhibiting the growth of the bacteria by raising the pH.
(3) Removing the deposits formed on the paint.

The first two can be done together by the addition of between 20 and 40 p.p.m. of sodium hydroxide. The last can be accomplished by spraying or washing the holder with a phosphoric acid rust preventer.

SAML. CUTLER & SONS
LTD.

Specialists in all types of Gasworks plant and Steel Constructional work

70, VICTORIA STREET,
WESTMINSTER,
LONDON, S.W.1.
Telephone: Tate Gallery 9592.
Telegrams: Retortus, Sowest, London.

PROVIDENCE IRON WORKS,
MILLWALL,
LONDON, E.14.
Telephone: East 5231-2.
Telegrams: Cutler, Millwall, London.

Report on Gas in France

Some interesting notes on the French gas industry, abstracted from the *Journal des Usines à Gaz*, by 'Ashton.'

WE congratulate our French contemporary, the *Journal des Usines à Gaz*, on the improved layout of the opening pages beginning with the January issue. The table of contents is set out nicely and is eminently legible, and the editorial page is much improved. It is perhaps a detail, but a detail not without importance.

The Editor casts an eye over the past year and considers briefly what the morrow may bring. Is the economy of carbonization to be again compromised by the evolution and the uncertainties of the market for coke? Shall we see further developments in the use of petroleum products for the manufacture of gas? Already 1954 showed an increase over 1953 of 30% for petroleum oil, of 150% in the use of propane, 'and soon the statistics will have to take account of refinery gases'. And there are the possibilities offered by the natural gas from the Lacq which, if published estimates are to be believed, may modify profoundly gas supply to a considerable area of France (in the South-West). Natural gas tends to take a large place in Europe, and, the Editor goes on, 'If the project of a main between Mosul and London appears to be definitely relegated to the scrap heap, the English Government seems to be contemplating seriously the importation by sea of methane from the Near East, in liquid form at atmospheric pressure in insulated containers'.

Pure Propane Replaces Coal Gas

Saint Maixent (pronounced Mek-sang) is a little town of some 5,000 inhabitants, in Deux-Sevres, a Department just inland from La Rochelle. Here, coal gas is to be replaced by pure propane. M. Kec, Past President of the Association Technique, describes the installation in the January *Journal des Usines à Gaz*. The send-out of coal gas in 1953 was 411,000 cu. metres (14½ mill. cu.ft.) of which 368,000 cu. metres were sold and 43,000 lost in leakage (or otherwise unaccounted for). The distribution system was saturated. A 50% increase in demand was anticipated, particularly from a large military school with a canteen to feed 1,600 'rationaires', as well as two housing schemes.

These schemes are to be placed on the side of the town away from the gasworks and it was decided to put down a stocking station for propane to deal with the new load and in proximity to it.

The military authority required that there should always be in stock propane covering a month's consumption of the school. It was therefore decided to provide a stock of eight containers. These are arranged in a circle in the open air with a crane pivoted at the centre of the circle with the outer end running on a concentric circular track. The crane lifts the containers from the road vehicle and places them in position, an operation which can be effected in 15 minutes by two men.

The propane is distributed at a pressure of 1.75 kg. per cu. metre (say 25 lb. per sq.in.) through steel pipes with a maximum diameter of 40 mm. The pipes are underground at a small depth. Pressure is reduced at the school to 400 mm. (say 16 in. w.g.). It is proposed eventually to abandon the coal gas works and to feed the town with propane/air.

Similar problems have arisen at Rochefort and Chatellerault. This type of solution has many advantages. Sales by 'thermie' allow, without any particular difficulty, the distribution in the same locality, of two gaseous fuels of different calorific value.

Examination of Gasholder Plating

M. M. Renaudie, Chief of Chemical Research of Gaz de France, describes an electro-magnetic method of ascertaining the thickness of gasholder plates in situ. Older methods were (a) visual, supplemented by chemical analysis of the water to ascertain the presence of corrosive content, and (b) sounding with the hammer. More recently ultra-sound methods have been suggested. The principal difficulty is that the 'feeler' must be applied, to give good results, to a surface sufficiently clean and flat, free from products of corrosion and paint, with interposition of a thin layer of grease to give good transmission of vibrations. These conditions are not generally present in the case of gasholders in operation.

The new magnetic measuring device for the thickness of plates is made by the Ateliers de Constructions Electriques de Charleroi to the design of the Laboratoires Berthold. The principle is as follows. An electro-magnet is placed on the piece whose thickness is to be measured and is switched on. About a second later the current is switched off. A current impulse takes place in two coils connected in series and situated at the poles of the magnet. This impulse is measured by means of a milliammeter strongly damped. The maximum deviation of the needle indicates the strength of the magnetic field. This deviation constitutes a measure of the thickness of the piece under examination.

Two types of apparatus are made, one for thicknesses of plate 0-5 mm., the other for thicknesses 0 to 10 mm. Accuracy is claimed to be of the order of 2% at the middle of the scales. Current is provided by accumulators, 6-volt for the 0.5 mm. scale, and 12-volt for 0-10 mm., though the larger voltage will serve for both scales. The total weight of the assembly, magnet, milliammeter and of the accumulator, together with a container for transport, is of the order of 30 kg (say 66 lb.). The apparatus is first calibrated against plates of known thickness. It is then applied to the surface of the gasholder; the curvature is generally large enough to be virtually flat. It has been shown in the laboratory that the measure is not affected by rust, paint, tar, etc., as long as these do not exceed 3 mm. in thickness, and that results are not falsified by products of corrosion adhering to the interior of the plates.

Investigations in practice are being pursued. On a gasholder at Valence of 5,000 cu. metres (175,000 cu.ft.) capacity, it was possible to detect numerous zones where thickness had been reduced by corrosion to 0.5 mm. from an initial thickness of 4 mm. and to detect 23 perforations masked by products of corrosion. This apparatus appears so far to give an elegant solution of the problem of examining the thickness of plates of gasholders in service.

Fire Precautions

M. V. Louis, Honorary Director of Gaz de France, outlines the Revision of August 13, 1954, of the Decree of February 7, 1941, on the Protection against Fire of Buildings and Premises open to the Public, with particular emphasis on the clauses affecting gas supply and utilization. The provisions relating to gas and heating are based on discussions and agreements with the appropriate committee of the Association Technique de l'industrie du Gas in France. The gas industry is to have a permanent member on the Central Commission; on the Department Commission the industry may be represented by an engineer specializing in gas questions who need, however, not be engaged in Gaz de France. M. Louis acknowledges the courtesy and sympathetic comprehension which he found in all the high officers who directed the work of revision, the officers of the Fire Brigade (Regiment de Sapeurs-pompiers) and all the members of the Central Commission of Security.

French Technical Terms

In April last a committee was set up to study French technical terms. 'Technical French' it is stated 'has undergone an invasion of foreign terms, mostly Anglo-Saxon. Trans-

1855

In 1855 Robert Dempster, a young Gas Engineer, founded at Elland a small Works for the production of all types of Gas Works Plant.

Today the business has grown into an organisation known throughout the entire Industry, playing its part in the field of technical advancement.

1955

ROBERT DEMPSTER & SONS LTD.

ELLAND, YORKSHIRE

DE DEMPSTER·ELLAND

GASHOLDERS · PURIFIERS · HORIZONTAL CARBONISING PLANT
CONDENSERS & STATIC WASHERS · MECHANICAL HANDLING PLANT FOR COAL, COKE & OXIDE

D

NEW WORLD

to the rescue

The need under Operation Rescue for a complete hot water service where none already exists has turned the attention of Architects and Municipal Authorities to the NEW WORLD Gas Storage Systems.

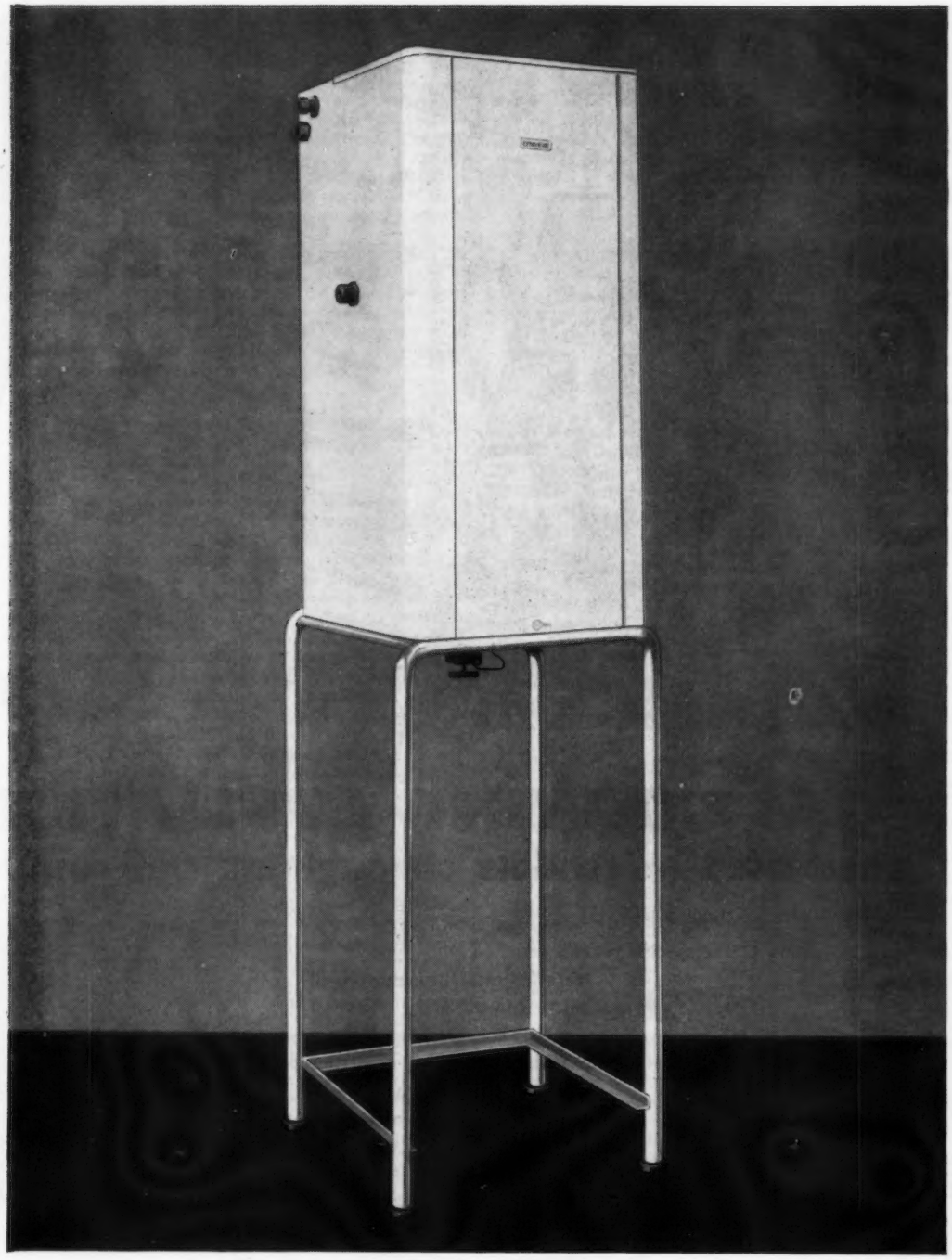
As an example, the NEW WORLD LYNMERE is a free standing, multi-point Storage Water Heater with a consumption of 15 cu. ft. of gas (C.V.500) per hour, designed to provide a complete hot water service by connection either direct to the mains, or to a cold water cistern. It will produce 16 gallons of water at about 140°F. regardless of cold water temperature, and is automatically controlled by the Regulo.

Cast iron cantilever brackets can be supplied for wall fixing or alternatively there is available a tubular stand to dimensions which allow the space to be used to advantage.

The installation is being extensively used in new houses and flats, and for the modernising and conversion of old property.

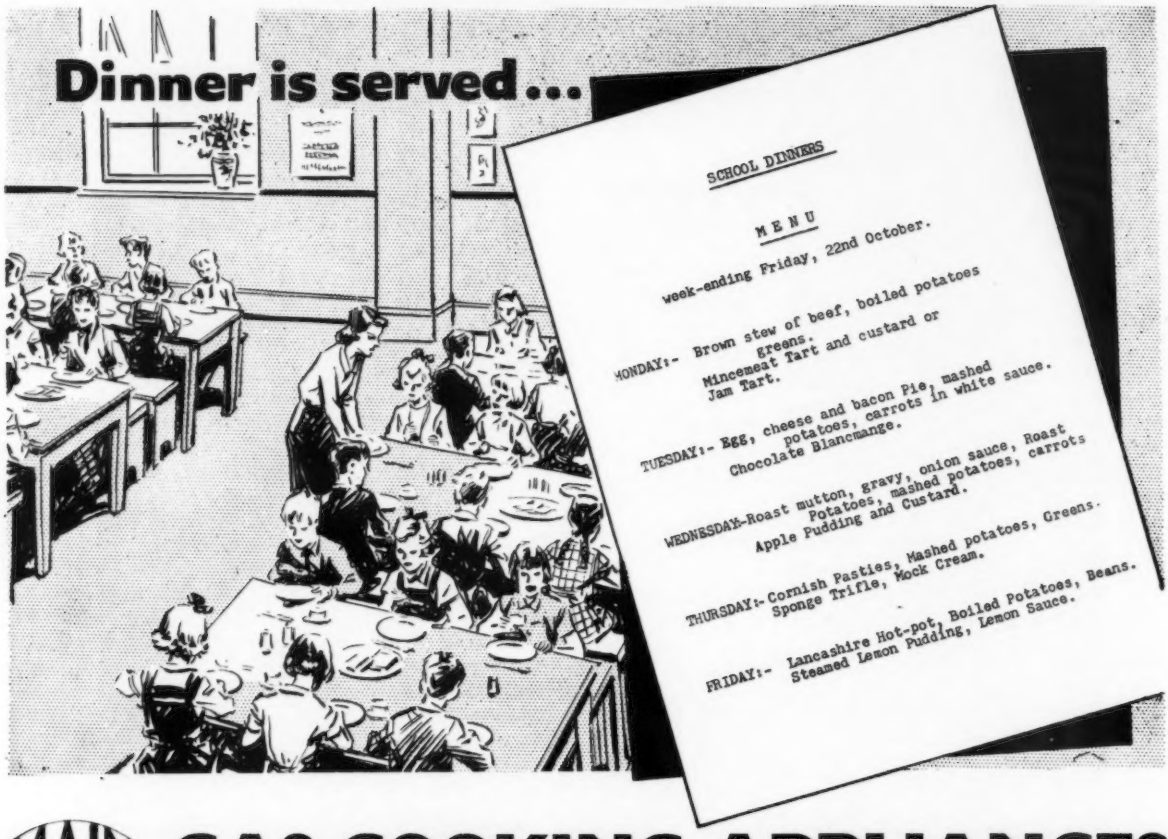
There is also the NEW WORLD C.12S Circulator which, fitted to a lagged 20 gallon cylinder, can be accommodated under the draining board in the kitchen—and a similar type of installation is available for use in an airing cupboard.

NEW WORLD Storage Water Heaters are reasonably priced, easily fitted, economical to use, provide hot water at the same temperature, Summer and Winter, can normally be operated on the existing Gas and Water Services and require an absolute **minimum of maintenance.**



recommend NEW WORLD PRODUCT OF Radiation Ltd *storage water heaters*

Further information from **RADIATION GROUP SALES LTD., 7 STRATFORD PLACE, LONDON, W.1.** *Phone: MAYfair 6462*

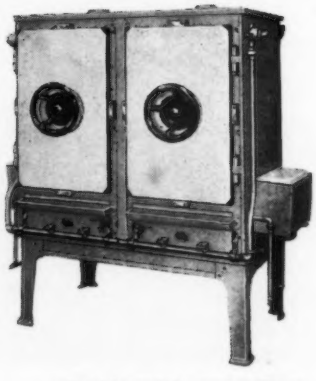

Dinner is served...
SCHOOL DINNERS
MENU
week-ending Friday, 22nd October.
MONDAY:- Brown stew of beef, boiled potatoes
Greens.
Mincemeat Tart and custard or
Jam Tart.
TUESDAY:- Egg, cheese and bacon Pie, mashed
potatoes, carrots in white sauce.
Chocolate Blancmange.
WEDNESDAY:-Roast mutton, gravy, onion sauce, Roast
Potatoes, mashed potatoes, carrots
Apple Pudding and Custard.
THURSDAY:- Cornish Pasties, Mashed potatoes, Greens.
Sponge Trifle, Mock Cream.
FRIDAY:- Lancashire Hot-pot, Boiled Potatoes, Beans.
Steamed Lemon Pudding, Lemon Sauce.

MAIN GAS COOKING APPLIANCES

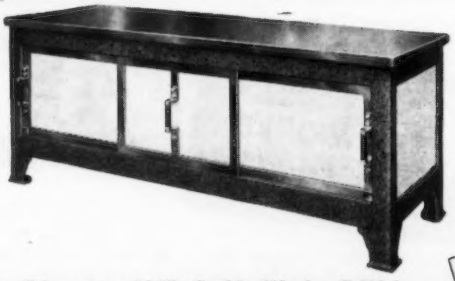
are used in schools throughout the country

The extensive range of Main large-scale cooking appliances cover the specific requirements of every type of catering establishment. Highly efficient in use and economical on gas consumption, Main appliances are strongly constructed to withstand continuous heavy usage . . . When it's a question of kitchen equipment, consult R. & A. Main Ltd.

DYW 2/62 Range
Two ovens, each with automatic heat control. Hotplate has 10 boiling burners or can be fitted with a combination of boiling and grill burners.



Gas Heated Steaming Oven
Available as Single or Double Compartment Batteries, each Oven heated by independently controlled aerated gas burners. No. 1824 Series has 7½ cu. ft. compartment fitted with 6 trays. No. 182424 Series has 6 cu. ft. compartment with 5 trays.



GHC/L Hot Closet
In lengths from 3' to 10' fitted with two shelves and sliding doors (one or both sides). The top either plain or incorporating Bain Marie with or without food containers.

Note the name - made by MAIN

R. & A. MAIN LTD., Gothic Works, Edmonton, N.18, Gothic Works, Falkirk

H 24

scribed in their original spelling and consequently not easy to pronounce, these words transform, for the uninitiated, the reading of many articles of technical information into a series of guesses (une suite de devinettes)'. At the same time, the Committee is animated by no spirit of nationalism. It recognizes that many foreign terms have passed into the language, as for instance the words, *film* (restricted to the photographic pellicle), *rail, tramway, wagon*. But it thinks it necessary to choose words which, in French, approach as closely as possible to the terms already in use abroad, so as to tend towards a practical internationalization of technical language.

The Committee, constituted under the patronage of the Ministries of Education, of Industry and Commerce, and of the Secretariat of Scientific Research, includes many important personalities (among them Professor Ribaud) under the presidency of M. Combet, Director-General of Gaz de France, with representatives of the universities, and of the principal technical associations with linguistic specialists.

Gas in 1954

Gaz en France is aiming at a sale of 3,000 mill. cu. metres of gas per annum. In 1954 it reached 2,980 mill. The results are briefly stated in the editorial to the February issue of the *Journal*. Domestic sales went up by 5% above 1953, 'coming, no doubt, in direct line, from the increase in the number of appliances in service (50% for cookers and 58% for water heaters in Paris during the first quarter of 1954). There was an increase of 6% in commercial and more than 10% in industrial sales; in the latter, it is noted with satisfaction that the increase has reached 90% over 1947 while in the same period the index of industrial production (excluding building) has risen by only 60%. The production of coke is slightly down, due to modifications in gas-making methods, but sales are up by 4%. The whole performance was achieved with a reduction of 500 in the personnel employed.

At the same time, the quality of appliances continues to improve, and the improvement is attributed to the working of the system of marks of approval. The mark NF-ATG is soon to be changed to NF-GAZ which with the collaboration of the Committee of Liquid Gases will be valid for all apparatus using gas, not only town gas, but also natural gas, propane/air, propane, and butane.

The Dry Gasholder

M. A. Defour, of the Bayonne gas undertaking, describes an automatic system of lubrication for the piston of a Klönne gasholder. Designed in collaboration with the Tecalemit Company it consists of a compressed-air driven compressor feeding grease under a pressure of about 200 atmospheres distributed in two circular ranges of steel tubing to 34 points equally arranged round the circumference. Air is supplied from an electrically driven compressor placed on the ground between two holders, supplying air at about eight atmospheres through flexible rubber tubing winding in and out on a drum and leading to the apparatus on the piston. The return on the drum is effected by a steel cable wound the opposite way to the flexible tube which is itself reinforced by a steel wire throughout its length. By a device on the compressor on the piston the grease is automatically fed to each point in turn in direct proportion to the linear displacement of the piston, and the quantity of grease ejected at each operation is regulated by a device exterior to the apparatus.

The description is illustrated by drawings and photographs. The author writes, 'This apparatus has been in operation on one of our gasholders for six months and has been giving entire satisfaction'. A grease of somewhat less consistency has been used than for manual lubrication. It is being extended to the second holder. The total cost is small in view of the economies which will be realized—in the increased life of the joints, in the elimination of gas leakage, in the complete absence of toxicity of the atmosphere above the piston, in the reduced maintenance of the holders, and the safety of the personnel in charge.

Ultrasonic Precipitation

M. F. Laure, Engineer to the Department of Research and New Techniques of Gaz de France, contributes to the February issue 'General Information and Bibliography on Ultrasonic de-dusting and de-tarring of gases'.

The principle of the process is that of a stationary field of sound waves, the distance between the source of vibrations and the reflector being theoretically equal to a whole number of half-wavelengths. The process of agglomeration of the particles appears to be due to three principal causes; the co-vibrations of the particles, the hydrodynamic forces of attraction and repulsion, and the 'pressure of the radiations'. The co-vibration of particles in suspension is due to the viscosity of the gas which tends to entrain them. If the frequency is small, or the particles very small, the amplitude of oscillation of the particle is sensibly equal to that of the gas. If, however, the frequency of vibration or the mass of the particle increases, the inertia of the particle is sufficient to separate it from the movements of the gas. It is possible thus to favour the agglutination of the particles. The other two causes are more complex. But it is possible to find an optimum frequency of vibration to produce agglomeration, and therefore precipitation, of particles or drops held in suspension in gases. It seems that this optimum, for fine dusts, is at the limit of audible sound—which is fortunate since the process can be applied without the inconvenience of noise.

Several practical applications are briefly described, using sirens and whistles. The cost is said to be less than that of electrostatic precipitation. The Cie. des Compteurs has patented apparatus using a siren, for the de-tarring of coal gas. It is to be placed immediately after the hydraulic main to condense the heavy tars, which will permit the use of smaller condensers of the conventional type.

It is concluded that ultrasonic vibrations can be used to precipitate the non-condensable tars. The whistle can be operated either with steam or compressed gas (the latter giving the better results because steam tends to absorb the vibrations). They can also be used to precipitate dusts. Attempts at application are not yet very numerous 'which leaves one to suppose that there are quite a number of difficulties yet to be overcome'.

Miscellaneous Items

A new high-pressure line connecting Nice and Monaco is described.

M. M. Fischer, of the Research Department, describes ovens with radiant panels designed by Gaz de France for the drying of paint on tractors.

The Department of Research and the Service of New Techniques have been amalgamated in a single organization under the name "The Direction of Research of New Techniques'. M. A. Bolzinger has been nominated Director and M. R. Delsol Joint-Director of the new organization. M. E. Biard has retired from the position of Joint Director of Research and has been nominated Honorary Director of Gaz de France.

Home Advisory Service

M. A. Six, Chief of Commercial Relations to the gas undertaking of Lille, sets out the organization and requirements of a service of women home advisers in the use of gas. 'We cannot attach too much importance to the organization of a corps of women home advisers possessing the necessary professional and personal qualities,' he says. This subject is also being taken up by the newly re-constituted Society for the Development of the Gas Industry in France which is dividing its work into three divisions (a) propaganda of domestic applications in Paris, (b) the same for the provinces, and (c) industrial and commercial.

The Belgian Royal Association of Gas Engineers has instituted a 'Certificate of (Gas) Comfort'. It attests that the property to which it is issued possesses the necessary facilities for the occupants to enjoy all the comforts which can be realized by the use of town gas. It is anticipated that the possession of this certificate will enhance the value of the premises to which it applies. To obtain the certificate, the proprietor or his architect applies to the gas undertaking, giving details of the facilities provided. A schedule of acceptable conditions is set out.

Mr. W. E. Cone, Technical Adviser to the British Road Tar Association, states in the current issue of *Road Tar* that arrangements are going ahead for the 10th International Road Congress which is planned to take place at Istanbul from September 26 to October 6.

Transportation of Bog Ore*

BY H. C. WALKER, ASSOC.M.INST.GAS E., M.I.EX.,
North Thames Gas Board.

FOR a number of years past the North Thames Gas Board has gone to considerable trouble in their search for regular supplies of good quality bog ore for gas purification.

Previous published information has in the main been concerned with the actual use of bog ore, and its characteristics and performance under varying conditions. As will be appreciated, a lot of preliminary work has to be done before the bog ore arrives at the gas manufacturing stations, and it is this phase of the operations with which I should like to deal.

It should be emphasised that there are numerous grades and types of bog ore, but for the purpose of this paper I intend to classify them under three headings:

1. Hard Bog Ore

This material is often almost pure iron ore having a low peat content, which sometimes necessitates grinding before use. Although it has a high iron content, because of its structural nature the availability tends to be low, the availability being the percentage of available iron in the total iron, and it is not favoured by the majority of gasworks in this country.

2. Peaty Bog Ore

This material contains a very high proportion of peat, and in many cases quite a high moisture content. The iron content is on the low side, but the availability figure is good. It is in quite good demand throughout this country, and providing the proper types are used, can be very active material.

3. Medium Peaty Bog Ore

This is the material favoured by the North Thames Gas Board, our aim being to obtain a bog ore with a medium peat content, with a moisture content not exceeding say 45%, a good iron content, and an availability figure of minimum 80%. This material, of course, falls midway between the two previously mentioned, and requires very careful selection to ensure that it is homogeneous in structure and free from grit and lumps.

In all the foregoing types it is essential that the silica content should be as low as possible, and this gives rise to many difficulties as the countries of origin of this medium peaty bog ore are usually abundantly provided with sand, and careful selection must be made to avoid excess quantities of this unwanted material.

Supply Difficulties

For many years past the bulk of the bog ore coming into this country has been dug in Holland, although at one time Belgium was quite a big supplier, and quantities have also been received from various other places such as Ireland, Finland, etc. As time has gone on, however, supplies of the best quality of material from Holland have tended to become exhausted. Such supplies as are left are being found further and further away from suitable means of inland transport, and as a result costs are rising.

It was, therefore, imperative that steps should be taken to discover new sources of supply, and in 1950 enquiries were made about the possibility of supplies from Denmark. It was known that there was bog ore in Denmark, but operations had been on a very limited scale, and were confined chiefly to supplying the Danish gasworks with their requirements, and to the export of small lots to the Scandinavian countries. Upon investigation it was found that Denmark possessed very considerable possibilities as a source of supply, and our normal suppliers with whom we had been working in close contact, took steps to explore the position to see if it was possible to offer us the type we need from that source. These investigations have been and are still proceeding in a satisfactory manner, as is evidenced by the fact that the North Thames Gas Board now buys the bulk of its bog ore requirements from Denmark, and the type of material we have been receiving has certainly proved to be quite satisfactory in use.

The Danish Geological Institute has been of considerable help in furthering our investigations, and although an export licence is necessary before bog ore can be shipped from Denmark, the Danish Board of Industry have done everything they can to facilitate our work.

Owing to our particular demands the selection of the right type of material is of great importance. It is usual, therefore, for officers from the Board to visit the supplying countries each year before the shipments can take place to inspect and sample the deposits which our suppliers have to offer. It is possible in most cases to tell by the physical texture and appearance of a deposit whether or not it is likely to prove satisfactory, and an immense amount of time is thus saved by avoiding the necessity of sending to this country a large number of samples, many of which are obviously not suitable for our requirements. Samples of fields which from their structure and general appearance seem to be satisfactory are then sent to the Board's works for chemical test, and if they conform with the specification roughly outlined above, permission is given for the material to be dug.

Fig. 1. Digging the bog ore.

I digress at this point to explain the nature of the deposits and the method of digging and handling. Generally speaking, bog ore is found immediately below the turf normally bordering streams or old dried-up water courses. When a supplier has discovered an apparently suitable field of material, which after sampling and analysing appears to be satisfactory, he negotiates with the farmer owning the land for a concession to dig the bog ore. The depth of the layer normally varies between 6 in. and 12 in., and it is part of the digger's contract to replace the turf that has to be removed to get the bog ore. Generally speaking, the land is in better

* From a paper presented to the London and Southern Junior Gas Association on March 4, 1955, entitled 'The Supply and Transportation of Bog Ore in Relation to Gas Purification.'

heart after the removal of the bog ore, and for this reason many farmers are quite anxious for this operation to take place. After the material has been dug it is necessary to transport it to the port of shipment. Owing to the wet nature of much of the land in which the bog ore is found, this can be an extremely difficult operation, and it is sometimes necessary to lay down a special narrow gauge railway to bring the material from the fields to the roadside. Owing to the unevenness of the strata it must be dug by hand, and it will be appreciated that this can be quite a long and laborious process. When the material has been brought to the roadside it is then loaded into lorries and transported to the nearest port of shipment capable of taking ocean-going boats. The normal size of boats used for the shipment of bog ore varies between 500 and 2,500 tons, usually dependent upon the facilities available for the reception of bog ore in the country of use.

In Holland much of the inland transport is, of course, done by canal, but otherwise operations are similar. It will, therefore, be appreciated that the cost of digging and transport in the country of origin, plus the cost of sea freight to the country of use, constitutes the major part of the ultimate price of bog ore.

Fig. 3. Strata of peat and bog ore. It is rather unusual to find peat on top of bog ore. Generally it is underneath.

Although, owing to the nature of the deposits, mechanization of the digging process is not feasible, progress is being made with the mechanization of certain other phases of the operations in an endeavour to reduce handling costs, and to produce a more homogeneous material.

Returning to the chain of operations, after the material has been dug and stacked on the roadside in large heaps, it is moved down to the ports for assembly prior to shipment. At this stage it is our usual practice to employ an independent sampler at the port of shipment to take a sample fully representative of the stock on the quayside and submit it to us for analysis. If, on analysis, the material conforms with our requirements authority is then given to the suppliers for shipment to be made. One of the most difficult points in the analysis is the question of the water content. In a naturally occurring material stacked in the open without cover of any sort it is obviously difficult to control the moisture content. Some bog ores whose physical structure is quite satisfactory at a given moisture content will, by the addition of a small quantity of water, become 'clayey' or 'sticky' in texture, rendering them not only difficult to handle, but if used in the boxes in that condition, will give rise to considerable difficulties.

Generally speaking there has been no difficulty with export licences from Holland, but a year or two ago an export licensing system was instituted in Denmark in order to conserve supplies of ores containing manganese. This necessity has resulted in the introduction in Denmark of a system of sampling and approval by the Danish Geological Institute before permission can be given for the material to be dug for export. When dealing with large quantities of bog ore this might result in some delay to shipment, but our experience has shown that with close co-operation between the diggers of the bog ore and the Danish Geological Institute such delays have been cut to a minimum, and operations have proceeded quite smoothly.

Fig. 2. Removal of turf and overlying earth.

Shipping Terms

I now come to the question of the terms relating to the shipping of the bog ore, and various conditions are indicated under which the purchaser can take delivery of the material from the seller.

In the first instance the purchaser has to decide by which method of delivery the bog ore is to be bought. There are three methods:—

1. Delivered Alongside Wharf, English Port

This is the best method of purchasing, the onus of delivering the bog ore alongside wharf, English port, being placed on the seller, including the insurance on the material, and the seller's calculated freight rate.

2. C.i.f. English Port.

This, in effect, is the same as delivered alongside wharf, English port, the seller's price including cost, insurance, freight.

3. F.o.b. Continental Port

In this case the purchaser would have to charter his own boat, he being responsible for all costs after the seller has placed the bog ore on board the steamer. Care has to be taken to see that the cargo is ready when the ship arrives for loading, for in the event of the purchaser declaring the date of arrival at port of loading, and if any bog ore is made available in barges to meet the ship, the purchaser would be liable for demurrage on the barges if the ship was late in arriving at the loading port. This is a point that can quite easily arise, although of latter years the tendency is for sellers to accumulate more of a stock of bog ore on the quay ready to be loaded into the ship on arrival. In the event of a large order being placed involving a series of voyages, the purchaser would have to

exercise care in obtaining freight cover from a ship owner or ship broker, as generally it is better to obtain freight cover at a fixed price per ton for the whole quantity the purchaser buys, rather than 'play' the freight market for each individual cargo.

The next point which is of importance is the fixing of suitable boats. The ideal type is the collier type of vessel with single deck holds, with size of hatchways measuring not less than 20 ft. by 15 ft., and also free of stanchions, as this type of steamer is easy to discharge in the normal way by grab lifting 3-3½ tons at a time. If a boat has a hold with a smaller measurement hatch, then it may be necessary to stop discharging and fit smaller grabs with a lifting capacity of about 2 tons, thereby slowing up the discharge and involving the purchaser in extra expenses for labour, unless otherwise provided. The purchaser should make it quite clear that boats should be suitable for normal discharge by grab. Further, vessels with 'tween decks should be avoided, as extra expense will in all probability be incurred for extra labour in clearing these awkward holds. Another type of construction which should be avoided if possible is the boat with a shaft tunnel running through the after hold, for if the bog ore is very wet, it may be difficult to clear the bottom of the hold by grab, and may have to be finally cleared away from the shaft tunnel by hand, thereby incurring extra expense. An additional difficulty is known to have arisen where a hold runs under part of the superstructure, which means there is a long 'throw' to get the bog ore into position to be grabbed out, so extra trimmers have to be employed which is an additional cost. It is worth mentioning that bog ore does not 'run' like coal, and any material which is inclined to be sticky would tend to add to the difficulties of discharging besides taking longer time to clear.

Fig. 4. Light narrow gauge railway used for removal of bog ore from field to lorries.

Purchaser's Responsibility

It will be seen from the foregoing how easily additional expense to purification costs can be incurred which are undesirable when adopting method No. 3 for the delivery of bog ore, but these additional expenses can also happen under methods Nos. 1 and 2, unless the purchaser makes the necessary safeguards. It is therefore necessary for the purchaser to make it perfectly clear to the ship owner or ship broker that he will not be responsible for additional discharging costs over and above those for normal discharge by grab.

The purchaser should arrange to cover the bog ore by insurance as soon as it is loaded into barges at U.K. port. If the purchaser decides to buy the bog ore under method No. 3, then the question of marine insurance arises which the purchaser would have to arrange. It is the usual practice for underwriters to issue a policy of insurance. Free of Particular Average meaning that the assured has no claim against Underwriters for partial loss, and can only recover for total loss. However, in the case of a vessel being stranded, sunk, burnt, or in collision, and 'general average' being declared, then the assured would be able to recover partial loss, provided his Marine Policy included a 'general average' clause.

In the event of a steamer being struck by a heavy sea coming right over the holds, it is possible, providing the force is great enough, for sea water to enter the holds and contaminate the bog ore and render it useless for purification purposes. By paying a small additional premium it is possible to extend the marine insurance policy to cover 'fouling of the cargo through the penetration of sea water.'

There is one subject about which there have been many discussions and differences of opinion, and that is the difference between loaded and discharged weights of cargoes, which in effect means that over a shipping season, the purchaser pays either more or less for his material in relation to the loaded weights, assuming that such payments are made on the basis of discharged weights.

It is a fact that at times the methods of arriving at the loaded weights of cargoes of bog ore on the Continent is ascertained by the draught of the ship, and barges to be loaded into the ship. There is certainly a doubt as to the accuracy of such method when it is realised that in the case of a 2,000-tonner a figure of 1 in. can mean about 12 to 15 tons of bog ore. Furthermore, the steamer would have to be on a perfectly even keel, without a list either to port or starboard, and not down at either the head or stern.

The best method is, of course, by electrically controlled grabs, when by pressing a button the operator first takes the tare weight of the grab, and repeats the operation to arrive at the loaded weight of the grab. When it is realised that to load a 2,000-tonner with a 3½-ton grab, the operators have to manipulate the buttons about 1,140 times, and then the whole operation is repeated when the cargo is discharged, making a total of about 2,280 operations, surely ,the human element might play its part at times.

Yet in spite of every care when loaded by grab on the Continent and discharged by grab in the U.K., these differences do arise, and it is only on rare occasions that the Bill of Lading weight is the same as the outturn weight.

Conclusion

In conclusion the following points emerge from the carrying out of successful business transactions covering the purchase of bog ore:

(a) Care to be exercised in the selection of the grade of bog ore required, backed up by approving samples before shipment.

(b) Adequate insurance cover if the onus of this is placed on the purchaser.

(c) Proper arrangements made in time for the speedy reception of the material on arrival of the ship at the port of discharge, so as to ensure the smooth distribution to the final points of delivery inland.

Finally the difference between loaded and discharged weights of cargoes is small when averaged over a shipping season.

TRENDS IN SCIENTIFIC MANAGEMENT

How efficient are the public services? There have always been differences of opinion on the extent to which the public services should apply to their organizations the scientific management which has been developed in industry. On April 18, Mr. E. F. L. Brech, senior partner of Urwick Orr & Partners, Ltd., will give the first of a series of talks on this subject culminating in a panel discussion on scientific management and the public services. The panel members will include representatives of the various branches of public service who will challenge Mr. Brech's conclusions in the light of the special conditions existing in their organizations. Those attending will have an opportunity to assess the extent to which the public services can apply the lessons of industry, how far they are doing so, and whether they have themselves developed techniques of management which better suit their organizations.

Ammonia Liquor as a Nitrogenous Fertilizer

By HENRY TOD, B.Sc., Ph.D., F.R.S.E., and
KENNETH SIMPSON, B.Sc., A.R.I.C.

Edinburgh and East of Scotland College of Agriculture.

In the spring of 1953 we were asked to investigate the possible use of 'ammonia liquor' from gasworks as a nitrogenous fertilizer, as the disposal of this material presents a serious problem to the gas industry in a number of areas. This paper reports the results of preliminary trials carried out in 1953, and recalls early work in this field. An article in the Highland and Agricultural Society of Scotland's Transactions (now the Royal Highland and Agricultural Society of Scotland) for 1843 was one of a series of 11 reporting some early experiments on the use of 'special manures'—a project supported by the Society which awarded 'premiums' varying from 50 to 10 sovereigns for reports from members on the trials they had carried out.

The first gas undertakings in Glasgow and Edinburgh were started in 1817 and 1818 respectively, and by 1820 to 1830 large amounts of naphtha were being supplied to Mackintosh, of raincoat fame, so that presumably the gas plants in the two cities were in fairly large production. About the same time street lighting was in use and from about 1825 onwards small local gas plants were being constructed as well. Presumably fairly large amounts of gas liquor were also available, and it was included in the list of materials used in these investigations.

It is difficult to assess results since the amount of the liquor applied varied widely—from 32 to 400 gal. per acre. The actual content of ammonium salts in the liquor was also variable. One report (*Trans. III, 1, 161*) refers to two liquors; one, from Leeds, contained the equivalent of 4-5 oz. of ammonium sulphate per gal., and another, from London, 12-15 oz. These values represent nitrogen figures of approximately 0.5% and 1.5% which, incidentally, tally fairly closely with the figures for 1953 raw liquors which varied from 0.5% to 2.5% or thereabouts.

For the purposes of a summary of these early results, it has been assumed that the nitrogen content of the liquor throughout was 1%. If this assumption is made, the average amount of nitrogen applied throughout the experiments was 16 lb. per acre, and similarly the nitrogen applied as sodium nitrate was 15 lb. per acre (assuming the sodium nitrate to be pure). Thus the average dressings of nitrogen in the form of liquor and of sodium nitrate were reasonably comparable.

Table I compares the average increases in grain and straw for oats produced by the sodium nitrate and ammonia liquor dressings in the 1843 experiments with the gains from comparable dressings of ammonium sulphate, interpolated from results quoted by Reith (Scottish Agriculture 1954, XXXIV, 91) from present-day experiments. The results for the latter series were given as 'oven-dry' grain, and for the sake of comparison, these have been re-calculated on the assumption that the 'fresh' grain and straw would have contained 20% of moisture.

TABLE I

Treatment	Sodium Nitrate	Ammonia Liquor	Ammonium Sulphate
	1843	1843	1950-53
Gain in grain (cwt. per acre) ..	3.2	2.9	3.0
Gain in straw (cwt. per acre) ..	7.1	7.0	4.3

The difference in response is small, and had it been possible to apply statistical methods to the 1843 findings, it is doubtful if any significant difference would have been found for gains in either grain or straw. Perhaps the most surprising thing about these results is the similarity between the responses obtained in grain yield between two sets of experiments separated by more than a century. The difference between straw responses may be explained by variable characteristics. In this connection it is interesting to compare the average yield from the plots which received no nitrogen dressing in 1843 with those quoted by Reith (1954) where the same tendency for the ratio of grain to straw to be higher in the modern results is shown in Table II. The grain yields in 1843 and 1950-53 are very similar, but it must be remembered that the 1843 work was probably carried out by the most progressive farmers working on highly fertile land, whereas the tendency at the present time is to select for experiments sites which are infertile.

TABLE II

	1843	1950-53
Grain yield (cwt. per acre)	18.2	17.8
Straw yield (cwt. per acre)	27.5	24.2

Each farmer made observations on the crops during the season. Seven out of 11 were impressed by the performance of ammonia liquor, the main comments being on the strength of growth and darkness of colour. The fertilizers were, in all cases but one, applied in liquid form as a top dressing one to two months after the oats were sown. In some cases leaf scorch was recorded, but recovery was noted as being rapid, and one farmer expressed the view that the scorch had little or no effect on the final yield. Several mentioned that the oats on plots treated with ammonia liquor and with sodium nitrate were laid, which was apparently regarded as an advantage. Six of the farmers applied the ammonia liquor in undiluted form, and the other five in dilutions varying from 1:2 to 1:200. It was not possible to distinguish between the effects of diluted and undiluted forms.

Average figures for three high, four moderate, and four low dressings of ammonia liquor show that the optimum response for both grain and straw was obtained around the 15-25 lb. N per acre level. There was a definite fall in response to the higher dressings, some of which were of the order of 400 gal. per acre. The optimum response to sodium nitrate on the other hand had not been reached even in the highest dressings applied.

The cost of the ammonia liquor varied from ½d. to 4d. per gal. The latter price appears to be high, and was responsible for the generally low profits from ammonia liquor dressings. The highest profit reported from ammonia liquor treatment was £3 16s. per acre. One farmer recorded a loss of 8s. 1½d. and another a profit of 1s. 4½d.

From the time of these early reports there seems to have been little, if any, interest in the use of ammonia liquor as a fertilizer until the end of the war in 1945. Investigations have been made in the last decade in Denmark, Germany, and England, particularly in Lincolnshire and around Southampton. This work had a twofold origin—the loss of valuable nitrogenous material (the volume in Scotland being 46 mill. gal. per annum, equivalent to approximately 10,000 tons of ammonium sulphate) and the problem of disposal of a waste product which was becoming an embarrassment in certain areas.

Since the start of the latest experiments, fairly extensive contract applications of the crude ammonia liquor, predominantly on grassland, have been made commercially in the Lothians and Border area as well as in England.

For the first year's work in 1953 a range of crops was chosen—potatoes and swedes at two centres and grass at three centres. The centres, at Armadale, Haddington, and Hawick, were chosen as near as possible to local gasworks;

these three centres showed a clear variation in climate and soil type (Table III).

The concentration of ammonia in the liquor is low and varies from 0.5 to 2.0%. In addition to ammonia and ammonium salts, several substances are present which may prove toxic to plant life—*e.g.*, thiocyanates, phenols, tar acids. Methods have been evolved for reducing the proportion of toxic materials but these processes are costly and the raw liquor was used in all cases. The nitrogen content of the liquor was at centre 1 (Armadale), 1.84%; at centre 2 (Haddington), 0.79%; and at centre 3 (Hawick), 1.37%. This meant a maximum application of about 1,400 gal. per acre of liquor at centre 2 to give a dressing of 112 lb. nitrogen per acre for potatoes.

The liquor was applied from watering cans with rose attachments. Handling was simple, but the smell of the liquor at centres 1 and 2 was very offensive. The liquor at centre 3 had little smell. Losses by evaporation are thought to have been negligible at centres 1 and 3 where heavy rain fell during or immediately after treatments. There may have been some loss at centre 2 where the liquor was applied on a dry day with a strong, cold wind.

The only immediate ill effects were seen on the grass plots at centre 2 where clover and grass were scorched by the liquor. The scorching of clover was severe, but a good recovery had been made by the end of the season. On the grassland plots, during the season, no visual differences were observed at centre 1 and at centre 3 only 'D' plots appeared superior. At centre 2, however, all other treatments were greatly superior to the control 'A' plots. The only visual difference observed on potatoes was that at centre 2 the leaves on the control 'A' plots were weaker and a paler green than on the treated plots. No visual differences were noted on swedes.

TABLE III.
GRASSLAND RESULTS—1953

Centre	Treatment *	A	B	C	D	E	S.E.
1	Yield of dry matter (lb. per acre)	6333	6398	6380	5830	6169	±302
	Uptake of nitrogen (lb. per acre)	81.7	89.5	82.9	78.7	87.2	
	% recovery of nitrogen from fertilizer	—	27.8	2.2	neg.	9.8	
2	Yield of dry matter (lb. per acre)	2689	5220	5359	5740	6235	±245
	Uptake of nitrogen (lb. per acre)	38.9	57.4	82.5	62.6	74.8	
	% recovery of nitrogen from fertilizer	—	35.2	41.5	45.2	34.2	
3	Yield of dry matter (lb. per acre)	3669	4037	3147	4713	3398	±240
	Uptake of nitrogen (lb. per acre)	51.4	56.1	47.5	73.1	52.7	
	% recovery of nitrogen from fertilizer	—	16.8	neg.	77.5	2.3	

* Treatments, at Centres 1 and 3; A—control, no nitrogen; B—28 lb. nitrogen per acre as ammonia liquor; C—56 lb. nitrogen per acre as ammonia liquor; D—28 lb. nitrogen per acre as ammonium sulphate; E—56 lb. nitrogen per acre as ammonium sulphate. At Centre 2, B and D treatments represent 52.5 lb. nitrogen per acre and C and E treatments 105.0 lb. nitrogen per acre.

At centre 1 there was no response to nitrogen either as ammonia liquor or ammonium sulphate. The figures for the apparent recovery of nitrogen were low or even negative. There was an excellent response to nitrogen in both forms at centre 2. The high dressing of ammonium sulphate gave a significantly better yield than the high dressing of ammonia liquor. This was not reflected in the nitrogen recovery figures, however. The low dressing of liquor gave a yield not significantly different from that produced by the low dressing of ammonium sulphate. All treatments were very much superior to the control. The recovery of nitrogen from all treatments was fairly good. At centre 3 the only outstanding treatment was the lower dressing of ammonium sulphate and it is difficult to understand the reason for this. The other treatments gave very disappointing results.

To summarize the position at the grassland centres, response to nitrogen treatment varied considerably from one place to another and it may be necessary to take into account the following points in explanation of this variation:—

1. A good response was obtained at centre 2 where the soil is sandy, the rainfall is low, the grass was a one year lea and the uptake of nitrogen from the control plot was only 39 lb. per acre.

2. A poor response was obtained at centres 1 and 3 where the soil is heavy, rainfall is high, the grass being third year lea at centre 1 and permanent at centre 3. At these centres, the uptake of nitrogen from the control plots was 82 lb. and 51 lb. per acre, respectively.

TABLE IV.
POTATO RESULTS—1953

Centre	Treatment	A	B	C	D	E	S.E.
1	Yield in tons per acre	17.3	17.5	17.5	18.3	17.7	±0.39
2	Yield in tons per acre	10.2	12.4	12.8	13.4	12.9	±0.31

Treatments were as for grass except that the lower dressings of nitrogen were 56 lb. per acre and the higher 112 lb. per acre. All treatments were applied at planting time. It was impossible to calculate the uptake of nitrogen since the shaws were sprayed down before harvest (Table IV).

It appears from the yield figures that the same pattern has been followed as in the grassland. At centre 2 an average increase of approximately 3 tons per acre in the yield of potatoes was observed, and all other treatments were significantly better than the control. At centre 1, however, the only significant increase over the control yield was shown by the low dressing of ammonium sulphate. The explanation of the widely different responses for the two centres may be the same as that given for the grassland experiments.

TABLE V.
SWEDE RESULTS—1953

Centre	Treatment	A	B	C	D	E	S.E.
1	Yield of roots (tons per acre)	19.4	22.2	21.3	24.2	24.6	±1.13
	Yield of tops (tons per acre)	3.5	4.0	3.7	4.1	4.4	
	Total nitrogen uptake (lb. per acre)	84.2	91.2	91.4	111.3	110.6	
	% recovery of nitrogen from fertilizers	—	25.2	12.9	96.8	48.4	
2	Yield of roots (tons per acre)	16.8	18.4	19.0	19.1	19.2	±0.49
	Yield of tops (tons per acre)	1.1	1.1	1.4	1.3	1.6	
	Total nitrogen uptake (lb. per acre)	68.7	80.2	83.0	83.9	96.5	
	% recovery of nitrogen from fertilizers	—	41.1	25.5	54.3	49.6	

Treatments were as for the grassland experiments (Table V). At centre 2 the tops were severely affected by a late attack of mildew, which accounts for the small yield. The true nitrogen recovery figures should accordingly be higher. At centre 1, the longer growing season for this crop, as compared with grass, appears to have been responsible for the responses to nitrogen which were much higher than in the grassland or potato experiments at this centre. Both ammonium sulphate treatments and the lower dressing of ammonia liquor gave yields superior to the control, a mean of 2.5 tons of roots per acre from ammonia liquor and 5 tons from ammonium sulphate. The uptake of nitrogen from the control plots was again very high and similar to that in the grassland experiment. At centre 2 all nitrogen dressings produced significantly higher yields than the control plot and the recovery of nitrogen from fertilizers was about the same as in the grassland plot.

Conclusions

For all three crops used, the ammonia liquor appeared to be almost as effective as ammonium sulphate in this season, and the effects of scorch seen on herbage at the time of application did not prove to be very serious. Any toxic materials present in the liquor would seem to have been decomposed rapidly in the soil as no ill effects from such materials were noted. The generally low response to nitrogen at centre 1 was, undoubtedly, due to the high amount of available nitrogen already present in the soil as shown by the nitrogen uptake from the control plots. Thus the findings in 1843 and those in 1953 show a marked similarity. A two-year programme for further investigation of ammonia liquor as a fertilizer was started in 1954, restricted to grassland alone; the results will be reported in due course. The authors thank the staff of the Scottish Gas Board for their interest and co-operation; Dr. A. M. Smith for interest and guidance; and members of the Chemistry Department of the College, who helped in the field and the laboratory.

HALF A CENTURY OF SERVICE

Recently retired from his job with the North Thames Gas Board at Brentford after 43 years' service with them is Mr. Jack Bell, of Chiswick. Mr. Bell has completed almost 50 years' service with the gas industry, as before joining the old Brentford Gas Company in 1912, he served with the Sunderland Company as an apprentice from 1905. He has, over the years, acquired valuable specialized knowledge on safety equipment, tools and materials used in the gas industry. At a ceremony held recently at Fulham, Mr. Bell was presented with a sum of money subscribed by his many friends and colleagues, the presentation being made by Mr. L. W. Andrew, Manager at Watson House, as shown above.

Mr. Bell intends to move at a later date to Littlehampton, where he hopes to be able to continue with his welfare and social work.

Coal Industry Wages

The National Coal Board and the National Union of Mineworkers at their meeting in London on March 15 reached agreement on the proposals for the partial rationalisation of the wage structure of the industry. Discussions will continue on the revision of other parts of the wages structure, including piece-workers and task-workers.

The stage now completed was agreement on the rates which should be attached to these various grades of jobs.

The implementation of these proposals will mean that the existing weekly minimum for underground workers will be increased from £7 15s. for Grade V jobs to £8 6s. 6d. and the existing weekly minimum on the surface of £6 15s. will be increased to £7 6s. 6d. for the lowest grade (Grade IV). Persons engaged on Grade I jobs underground who may have been in receipt of the underground weekly minimum will receive an increase while doing this Grade I job to £9 10s. 6d., while a workman performing Grade I work who may at present be on the weekly minimum for the surface will receive an increase to £8 4s. 6d. per week. Such differential increases are necessary to eliminate anomalies.

It is estimated that these proposals will cost the National Coal Board about £13 mill. a year.

Gas Men to Box at Basle

Three amateur boxing champions from the Cardiff Gas Amateur Boxing Club, are members of a team of eleven Welsh boxers picked to fight Swiss boxers in Basle on March 30, and Lucerne on April 1. They return to London on April 4. Managing the team is Charles Fearnley, a representative of the Wales Gas Board, who is Secretary of the Club.

Fighting as a light welter-weight is Tony Howard, a gas-fitter's mate, who was Welsh and Youth Champion in 1953 and 1954. Storekeeper Bill James is a middle-weight who has represented Wales against Ireland, the Army and the Navy, while feather-weight Peter Simonds is Welsh and British Youth Champion.

Officials and members of the Club, which was founded in 1932, include men well-known in amateur and professional boxing, among them the 'Gasworks' family of Gallies. Alf Gallie, Club trainer for many years, is now coach to Oxford University and was official coach to the British Olympic team at Helsinki. His brother Cyril, who turned professional after a successful career as an amateur, now shares training duties with Jack Pottinger, who fought in America in the Golden Gloves contests.

'Trying to Create a Monopoly'

The Electricity Board of Northern Ireland was accused at a meeting of Bangor Borough Council on March 15 of trying to create a monopoly by requesting a yearly guarantee for five years of £6 for the supply of current to each house built by the Bangor Provident Trust, a private concern which plans to build 300 houses, including dwellings for old people at Bloomfield Road, Bangor.

Alderman Thomas Bailie said the guarantee asked for completely ostracised the use of gas for cooking in these houses. There was an important principle at stake, and he thought the Board's application should be strongly deplored. The tenants of the houses would, in many cases, be unable to pay for both gas and electricity and would, therefore, be forced to cook by electricity.

Councillor Samuel Napier declared that the guarantee was specifically directed against the municipally-owned gas undertaking. It would appear that they were trying to create a monopoly, and the guarantee would deter anyone from having gas installed for immediate heat and cooking.

Natural Gas and British Firms

Following the trip to Canada last year of Mr. R. T. Redfern, Managing Director of the Bryan Donkin Co., Ltd., Chesterfield, in connection with the supply of equipment for the distribution of natural gas, comes the news that a representative of the firm has gone to the other side of the world in connection with a similar project.

The firm's Technical Sales Manager, Mr. T. W. Aiken, flew to Pakistan where he is to investigate the distribution of natural gas, following a number of enquiries from firms in that country. The Bryan Donkin Co. also has a number of quotations out for the supply of necessary distribution equipment in Pakistan and one plant has already been sent out on trial. It is the first of its kind to be seen in Pakistan.

Also helping to pioneer the tapping of natural gas resources in Pakistan is British Furnaces, Ltd., an associate company of Bryan Donkin, Ltd. British Furnaces have an order to supply burner equipment for 28 Lancashire boilers at various industrial concerns in Karachi. When these are working they will be burning natural gas at the rate of 350,000 cu. ft. per hour—and in view of the high calorific value of Pakistan's natural gas this is said to be equivalent to twice that amount of town gas.

The firm also had a considerable number of enquiries for plant for burning natural gas, and is in an advantageous position to deal with enquiries of this nature, in view of its close alliance with an associated company in America, Surface Combustion Corporation of Toledo, Ohio. This company deals with vast natural gas resources in the United States, and British Furnaces are therefore in possession of valuable technical information and data.

An entirely new hotplate designed for use where space is at a premium

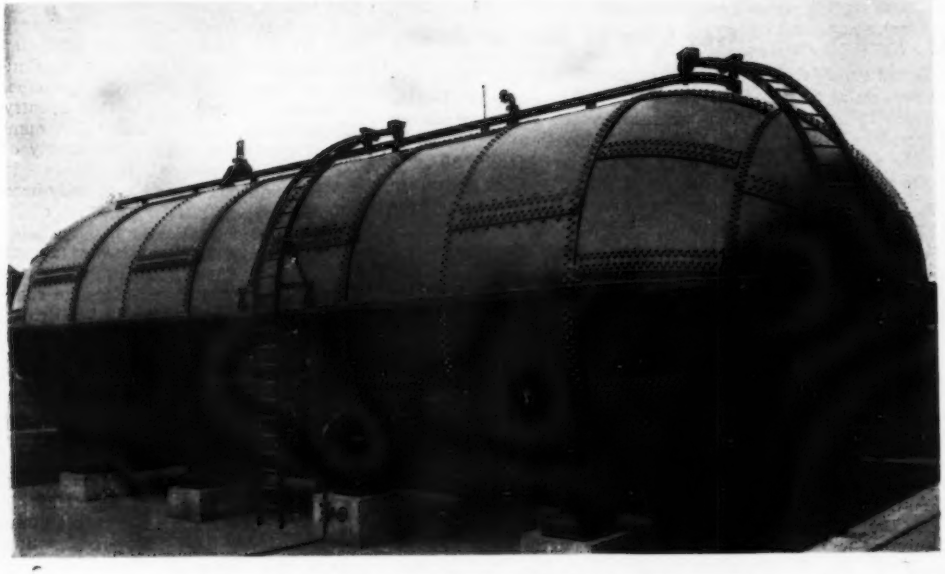
The Leamington Hotplate provides a high speed grill and two fast boiling burners in a hotplate designed for conditions where a complet cooker is either not required or cannot be fitted.

The Leamington HOT PLATE

MAKERS OF FINE QUALITY COOKING AND HEATING APPLIANCES SINCE 1777

Manufactured by FLAVELS OF LEAMINGTON

Telephone: 100 (Head Office) 3091/2 (Sales) Telegrams: FLAVELS



HIGH PRESSURE GASHOLDER
OF
RIVETED CONSTRUCTION
WORKING PRESSURE 100 LBS. PER SQ. INCH
DISCHARGING CAPACITY: 95,000 CUBIC FEET

C. & W. WALKER LTD.
DONNINGTON
NEAR
WELLINGTON
SHROPS.

GASHOLDERS
OF
ALL TYPES

'Phones:
Wellington - Shrops. 12
and
London - Victoria 5842

'Grams:
"Fortress,"
Donnington - Shrops.

London Office:
70 Victoria Street,
S.W.1.

16

WOMEN'S GAS FEDERATION ACTIVITIES

Six hundred members of the Women's Gas Federation from all parts of Britain will meet for a three-day conference at Eastbourne, Sussex, from May 3-6. Sir Hugh Beaver, one of the principal speakers, will talk on clean air.

Delegates will put questions to a team of experts consisting of Dame Vera Laughton Mathews, the Federation's Chairman, Mrs. E. R. House, H. M. Staff Inspector of Housecraft, Mr. R. S. Johnson, Deputy Chairman, South Eastern Gas Board, and Mrs. Alison Settle, the well-known journalist.

During the conference the Federation holds its annual general meeting. In the chair will be the President of the Federation, Miss K. M. Halpin, C.B.E.

Planning the Kitchen

At the March meeting of the Scarborough branch of the Women's Gas Federation the President, Mrs. D. M. Haigh, presented Miss M. Godby, Technical Officer to the Federation, who gave a talk on 'Planning the Kitchen.' There was a further increase in members—102 being present. The judging of the cake competition which attracted 23 entries was carried out by Miss S. E. Harrison, the winner being Miss L. Curry.

New Branches

Opening meetings of new branches of the Women's Gas Federation have been held at Christchurch and Wimbledon. Those present at Christchurch were Mrs. Ashcroft, the Mayoress, who was elected the first President of the branch, Mr. J. T. Haynes, O.B.E., Divisional General Manager, Southern Gas Board, Dame Vera Laughton Mathews, D.B.E., Chairman, Women's Gas Federation, and Miss Pendlebury, Chairman of the branch. The Mayoress paid a tribute to the industry when she said she did not need to be converted to gas, as she had received wonderful and efficient service from the appliances she had bought over 15 years ago.

The Wimbledon meeting was attended by over 80 ladies, including the Mayoress, who accepted office as the first President since the branch had been re-formed. Dame Vera Laughton Mathews spoke of the aims of the Federation and referred to the fact that the newly elected Chairman, Mrs. Farror, was following a family tradition, as her mother, Mrs. Croft, had been Chairman of the Wimbledon Branch, when it was originally formed before the war. Among those present were Mrs. Mair Jones, Chief Home Service Adviser to the South Eastern Gas Board, Miss Frith, General Secretary, Women's Gas Federation, and Mrs. Linley-Howlett, Vice Chairman of the Branch.

The 109th Branch

The Halifax Gas Development Association for Women has recently affiliated with the Women's Gas Federation, thus becoming the 109th branch of the Federation.

Miss Jessie Frith, General Secretary of the Women's Gas Federation, addressed members of the Loughborough (Leics.) branch on 'Women's Contribution in Public Affairs.' She said she knew the Women's Gas Federation was doing 'a very great deal'. And women's organizations generally, could do a lot in the way of turning out many useful citizens. Thanking Miss Frith, the chairman, Mrs. W. P. Stagg, said: 'I cannot imagine that any one of us would like to go back to the days when women had no interest other than the home. Life must have been very dull and monotonous.'

PLANT ENGINEERS' OPPORTUNITIES

The Earl of Verulam (member of the North Thames Gas Board), Sir Leslie Hollinghurst (Chairman of the National Industrial Fuel Efficiency Service), and Dr. W. Idris Jones (President of the Institute of Fuel) were among the principal guests at the third annual dinner of the Incorporated Plant Engineers at the Park Lane Hotel recently.

Responding to the toast of the Incorporated Plant Engineers, proposed by General Sir William Platt, Mr. R. H. Cobbold (President) said we were living in the age of a second industrial revolution. In recent months there had been announced schemes involving the expenditure of £1,900 mill., and no doubt in other circles considerable sums had also been approved which had not received publicity. One wondered where the brains were coming from to devote to the works which these vast expenditures were intended to provide. There could be no question that this was an era of the most intensive scientific and technical development. He mentioned the recent research into friction, made possible by the use of radio-active isotopes and other modern techniques; the achievements of civil engineering in the development of hydro-electric power at Niagara Falls; and the use of germanium—a direct development from work on guided missiles. If these things were coming into industry, engineers had to be prepared to cope with them, and it was one of the primary functions in Incorporated Plant Engineers to afford members opportunities to improve their knowledge, to keep themselves up to date, and to learn about these new techniques. A great deal of time, research and effort went into the production of machinery by machinery makers. It was equally important if that machinery was to give satisfactory results that it should be properly cared for when it reached its particular field of operations, whether it be outdoors or indoors. That was the field in which plant engineers worked.

Accepting the certificate of Honorary Membership, Sir Oliver Lyle said he thought that what the plant engineer needed more than anything was faith and hard work, faith in his job, and faith in his ability eventually to persuade his management to do what was right, faith in his technology; and hard work, not only in doing his job, but in working at his technology to ensure that it was up to date and appropriate.

YORKSHIRE JUNIORS' TRIPLE BILL

The members of the Yorkshire Junior Gas Association are enthusiasts. In spite of the fact that Huddersfield Town were at home to Newcastle United and that York City were playing Notts County at Nottingham in vital cup tie football, and that there were other big football matches in Leeds, Bradford, and other West Riding centres nearly 70 members met at Wakefield, on March 12 to hear three short papers read, on 'Benzole Production' by T. Clegg (Leeds), 'Iron Bacteria in Gasholder Water' by A. R. Mitchell (Bradford), and 'Appliance Reconditioning' by N. T. Voce (York).

Actually the papers were not so very short and although the President, Mr. D. C. Henderson, did his best to keep the discussions within reasonable limits it was plain that any one of the three papers might well have occupied a full meeting. The meeting started at 2.30 and it was turned 5 p.m. when Mr. Henderson reluctantly had to close the discussion. Among those who had taken part in the discussion on benzole were Messrs. Henderson, Wilkinson (Huddersfield), Edgar (Mirfield), Egan (Leeds), Firth (Leeds), Nicholls (York), Griffiths (Bradford), Hoffman (Harrogate), E. C. Williams (Leeds): on iron bacteria, Messrs. Henderson, Firth, Nicholls, Egan and Griffiths, and on appliance reconditioning, Messrs. Henderson, Griffiths, Mitchell, Nicholls, Roberts, and other members from Bradford.

Mr. Edgar (Mirfield) on behalf of the Association thanked the authors for an interesting afternoon, and Mr. A. Bushell of Huddersfield thanked Mr. J. M. McLusky of Wakefield for his hospitality.

The Council of the Royal Ulster Agricultural Society on March 15 sanctioned the installation of luminous panel overhead gas-heaters in the King's Hall, Balmoral, Belfast. The hall is the largest public hall in Northern Ireland.

Elliott Brothers (London), Ltd., together with their subsidiary, The Bristol Instrument Co., Ltd., are holding a special demonstration and exhibition of telemetering equipment at The Grand Hotel, Manchester, on April 19 and 20. The type of equipment being shown is now being installed in connection with many of the big integration schemes which are being undertaken by the gas boards throughout the country, including the South Wales gas grid scheme.

NEWS IN BRIEF

Two Years Have Passed since Honeywell-Brown, Ltd., opened their first Birmingham office. During that time the demand for industrial instrumentation and automatic controls for space heating, ventilating and air conditioning has increased. To meet this accelerating demand the Birmingham office has now moved from Stephenson Place to larger premises in Sutton New Road, Erdington, Birmingham, 23. Under the management of Mr. P. R. Prior the new office will provide improved sales and service facilities in the Birmingham area.

The Village Gasworks at Barrow-on-Humber, Lincs., made gas for the last time on March 27, when the fire was raked from the five small retorts, a valve opened, and the local holder was filled from a new main from the neighbouring town of Barton-on-Humber. For as long as the 120 consumers in the village can remember their gas has been made in the works by only one man. For the last two years the stoker has been Mr. John Dean. Mr. Dean was not present to close the works for he was in hospital with eye trouble; his place was taken by his relief stoker, Mr. Harry Blanchard.

Glasgow Corporation is again being asked by the South West Scotland Electricity Board to broaden its policies regarding cooking facilities in Corporation schemes. At present the city maintains a balance by installing gas appliances in Corporation schemes, giving electricity lighting and power points. The electricity interests have asked the Corporation to reconsider the situation and report a 'very kind and sympathetic hearing.' A sub-committee has been formed to consider the points raised and a decision is expected after consultation with all the interests concerned.

Coke Sold by the North Western Gas Board during the four weeks ended February 27 amounted to 184,000 tons, a fall of 10% compared with the total of 204,000 tons sold in February, 1954. The reason for the fall is that the recent exceptional rise in coke demand has placed a heavy strain on the Board's coke distribution facilities, and in some districts deliveries have had to be limited. Sales in the first 11 months of the current financial year amounted to 1,544,000 tons, and were up by 7% compared with sales in the same period of 1953-54.

Belfast Corporation is now in a position to proceed with its scheme to erect four or five high pressure gasholders on a site at Greencastle to augment the main supply. The work is estimated to cost £100,000. There have not been any objections to the Corporation's application to the Ministry of Commerce for an order confirming the use of a three-acre site for the project. In 1952, after the Government had announced plans for a satellite town at Rathcoole, the Corporation Gas Committee took a long-term view of the needs of the area and obtained the site from the Improvement Committee.

In the 'Journal' of March 23, under the heading 'Road Tar' we referred to an article by the Chairman of the British Road Tar Association. This should have read, 'of the Coal Tar Research Association' (Mr. Richard Robinson).

The Town Councillors of Cockenzie and Port Seton, East Lothian, were discussing the cost of installing gas facilities in new houses, and the question was raised whether the Council should instal gas in houses intended mainly for old people. There had been, it was stated, a number of accidents to old people through gas. The Council agreed that if there were no obstacles in the way, the houses should be all-electric.

Coleraine Borough Council has suggested that efforts should be made to investigate the use in Northern Ireland of fuels other than coal in the manufacture of gas, and that, in co-operation with other gas undertakings in the Province, the Minister of Commerce should be urged to set up a committee to examine the economic position of the industry. This proposal is still being pursued. Meanwhile the coal position in Northern Ireland is improving, but as far as the gas industry is concerned it is still far from satisfactory. Managers all over the Province would like to have much larger quantities of coal in their yards, but they are hoping that it will be possible to undertake some stock-piling during the summer.

The Butterley Co., Ltd., announce that their address is now 9, Upper Belgrave Street, London, S.W.1. Telephone: Sloane 8172-3 and 9106-7.

The South Durham Steel and Iron Co., Ltd., has brought into operation another battery of 26 coke-ovens at their West Hartlepool works, and another battery will be commissioned towards the end of 1956.

The National Coal Board's Organization

The National Coal Board has now taken various decisions about its organization and about the way in which it should be made to work. There is to be no change in the main structure of the Board's organization.

The collieries will continue to be organised in areas and the areas will continue to be responsible to the eight main divisional boards. There will continue to be a divisional board for Kent. This decision accords with the advice given by the Fleck Committee that the main structure of the organization contains 'no big defect which is hampering the industry in solving its problems.'

On the other hand, the Board's departmental organization is to be changed and strengthened. Three new departments—for staff, for industrial relations, and for purchasing—are to be set up. Reference is made to new appointments in our 'Personal' column on p. 838.

IDEAL HOME EXHIBITION

Television viewers who saw the feature programme of the visit of the Easter Bride to one of the model kitchens at the Gas Pavilion on February 28, will recognize Miss Josephine Douglas, who compered the programme. She is seen on a private visit to the Gas Pavilion, where she was presented with a copy of the Council's latest publication 'The Happy Home,' *by Mr. C. Warrenne, Exhibitions Officer. Miss Douglas is well known to viewers of the popular T.V. feature 'Find the Link'.*

UNIT SUPERHEATERS

In the utilization of steam, particularly for prime movers, such as turbines and engines—and today also for general process and heating requirements—it is recognized by all leading authorities that Superheat-Desuperheat contributes immeasurable advantages, particularly in coal/oil savings.

A typical example: Superheat-Desuperheat applied to one Lancashire boiler plant saved 120 tons of coal per week.

As pioneers in Superheat application we build into our Unit Superheaters the accumulative experience gained over 40 years of close specialization.

The basic advantages of this application are many and well-known, and the resultant fuel economy well established.

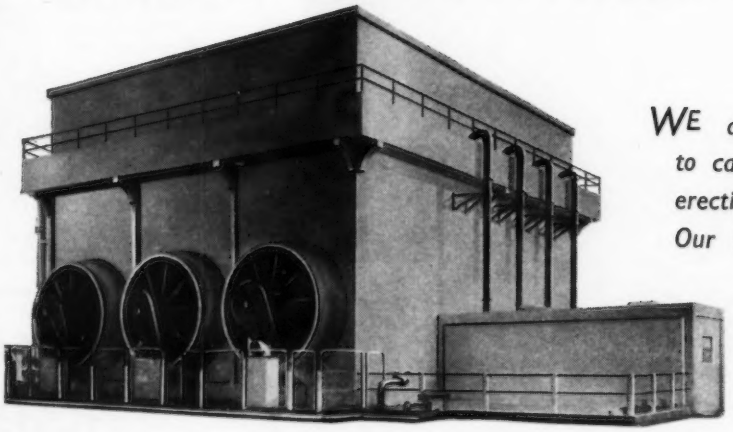
Automatic temperature control of steam within plus or minus 2/5° F. can be readily obtained, adjustable for winter and summer conditions as required. These advantages are possible by utilizing, re-circulating and flashing to steam, existing condensate water.

The Unit system accomplishes more with less expense.

THE UNIT SUPERHEATER & PIPE CO. LTD.

UNIT WORKS, SWANSEA. *Telephone: Swansea 4091 (6 lines) Telegrams: 'Superunits', Swansea*

SPECIALIZED COOLING . . . . FORCED DRAUGHT



WE are fully equipped to carry out promptly the erection of Cooling Towers. Our Representative will call upon you at any time.

INQUIRIES INVITED.

Cascade WATER Coolers LTD.

BREWERY LANE, DEWSBURY . . . Phone: Dewsbury 1735

J. BROWN & CO. LTD.
SAVILE TOWN, DEWSBURY, YORKS.
Supply:–
"BROWNOX-de-LUXE" PURIFYING MATERIAL
Purchase:–
SPENT OXIDE

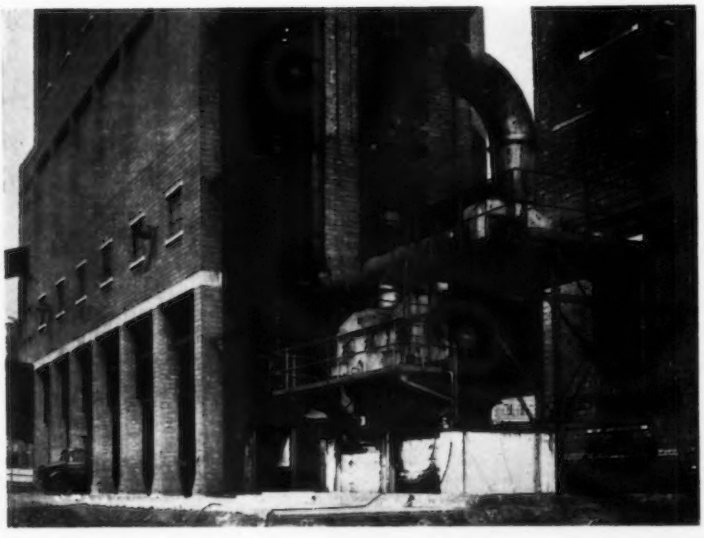
THE **WORMALD PATENT LOCKS Co LD**
SHEFFIELD 8
MANUFACTURERS OF GAS METER LOCKS
TEL. 27328 SHEFFIELD 'GRAMS : LOCKS, SHEFFIELD

UNDERPRESSURE ENGINEERING CO., LTD.
UNDERPRESSURE CONNECTIONS
SPLIT COLLARS
SOCKET CLIPS
UNION FOUNDRY, MANSFIELD, NOTTS.
ALL TYPES OF DISTRIBUTION MATERIAL IN STOCK
Service Enquiries :
STAFFORD HOUSE, NORFOLK STREET, STRAND, W.C.2.
'Phone: MANSFIELD 1256. 'Phone: TEMPLE BAR 9910.
'Grams: CASTINGS, MANSFIELD. 'Grams: WASHER, ESTRAND, LONDON
CENTRAL ACTION DRILL STANDS
SERVICE CLEANSERS
TOOLS, ETC.

COAL AND COKE SCREENING & SIZING PLANTS.
RETORT SETTINGS
PRODUCERS, FURNACES
REPAIRS

GOODALL, CLAYTON & Co. LTD.
LEEDS.
CONVEYORS, ELEVATORS, BUNKERS, ROOFS, HOISTS, Etc.

WELL PROVED SOLUTION OF GASWORKS DUST PROBLEMS



- RETORT HOUSE DUST EXTRACTION.
- COKE SCREENING DUST EXTRACTION.
- CLEAN AIR FOR CALORIMETER ROOMS AND LABORATORIES.
- FLUE GAS WASHING, ETC.

There is no need for experiments which may prove very costly. Enjoy the benefits of lessons learnt in many years of experience in the British Gas Industry where our plant was cradled, and in which it has continually developed.
WE SHALL BE PLEASED TO COME AND DISCUSS YOUR REQUIREMENTS WITH YOU.

DRUMMOND PATENTS LTD.
5, GREAT WINCHESTER STREET, LONDON WALL, LONDON, E.C.2.
Telephones : LONDON WALL 2626 & 4432
Northern Office : 141, ROYAL EXCHANGE, CROSS STREET, MANCHESTER, 2.
Telephone : DEANSGATE 7015.

PUBLISHERS' NOTICE

The " Gas Journal " is published every Wednesday, price **1/3d.**; by post **1/5d.**

Subscription Rates: Home and Empire:—**52/-** per annum; Foreign:—**60/-** per annum. (Both payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at **2/-** per line (approx. **7** words)—minimum charge **10/-**. A Box Number address occupies **2** lines, and a further **6d.** is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received **14** days prior to publication if proofs are required. Type area of inside pages **10** in. deep × **7** in. wide; block screen **120.**

BUSINESS MANAGER: S. T. CULLEN

MIDLANDS MANAGER: G. B. Torrance, 42, Wychall Lane, King's Norton, Birmingham, 30. *Telephone:* Kings Norton 3868

NORTHERN MANAGER: Philip W. B. King, Flat 1, 7 Langcliffe Avenue, Harrogate. *Telephone:* Harrogate 67625.

SOUTHERN REPRESENTATIVE: A. Engelhardt, 11, Bolt Court, Fleet Street, E.C.4. *Telephone:* Central 2236-7

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.

Telephone: CENtral 2236-7. *Telegrams:* Gasking, Fleet, London.

OXIDE

DUTCH AND DANISH BOG ORE
SPECIALLY ACTIVATED OXIDE OF IRON

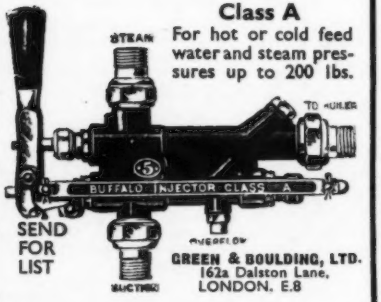
Oxide supplied on loan or sale outright.
Highest prices paid for Spent Oxide

Send your enquiries to

GAS PURIFICATION & CHEMICAL COMPANY LIMITED
ESTABLISHED 1873
PALMERSTON HOUSE, BISHOPSGATE, LONDON, E.C.2.

Telegrams: "Purification, Stock, London." Telephone: London Wall 5077

BUFFALO INJECTORS



Class A
For hot or cold feed water and steam pressures up to 200 lbs.

SEND FOR LIST

GREEN & BOULDING, LTD.
162a Dalston Lane, LONDON, E.8

"KLEENOFF" *
THE COOKER CLEANER

"KLEENOFF"
FIBRE BRUSHES
RUBBER MOPS

"KAY-DEE" *
KETTLE DESCALER

For resale to the public, and in bulk for works use.

BALE & CHURCH, LTD.
7, CROMPTON WAY, CRAWLEY, SUSSEX

ROOK BROS. LIMITED

FOR—

Every aspect and requirement connected with the

STRUCTURAL STEELWORK
of
GASHOLDERS
and
GASWORKS PLANT

ENQUIRIES INVITED:
32, Collier Row Lane,
ROMFORD, Essex.
Tel.: Romford 5174

The
LIMIT OF EFFICIENCY CAN BE REACHED
by the use of
LUX
GAS PURIFYING MATERIAL

Sole Importers:
HARRISONS (London) LIMITED
66, Mark Lane, LONDON, E.C.3
Telegrams: Birchrock, London *Telephone:* ROYal 3120

PLANT FOR SALE

SOUTH WESTERN GAS BOARD

THE following charging/discharging machines are available for sale due to the recent closure of the two Works shown:—

AT TEIGNMOUTH

Jenkins de Brouwer, suitable for retorts up to 6 ft. 4 in. centre above rail level and a through length of 15 ft., all electric D.C., 3-ton coal hopper.

AT NEWTON ABBOT

Guest-Gibbons, suitable for retorts up to 6 ft. 6 in. centre above rail level and a through length of 15 ft., all electric D.C., 30 cwt. coal hopper, a considerable number of suitable spares including three motors, etc.

For further information, appointments to view and offers, please communicate with the undersigned.—

H. G. STAPLEY,

South Western Gas Board,
Hollacombe,
Paignton.

PATENTS

KINGS PATENT AGENCY, LTD
(Director, B. T. King, A.I.M.E., Patent Agent)
Advice, Handbook, and Consultations free. 146a, Queen Victoria Street, London, E.C.4. 'Phone: City 6161.

APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

SOUTH WESTERN GAS BOARD

BRISTOL/BATH DIVISION
PRODUCTION DEPARTMENT

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT at the Avon Street Gasworks, Bristol.

The appointment will be within Grades A.P.T. 5, 6 and 7, according to experience and ability.

Candidates should have good knowledge and experience of gas manufacture. The manufacturing plant at Avon Street Works consists of Horizontal Retorts and Water Gas Plant.

The successful applicant will be required to pass a medical examination, and to join the Board's Staff Pension Scheme, unless he is otherwise ineligible in accordance with the Rules of the Scheme.

Applications in writing, giving the names of two referees, should be received by the undersigned not later than April 16, 1955.

CHARLES R. INGHAM,
Production Engineer and Manager.
Radiant House,
Bristol, 1.

SOUTHERN GAS BOARD

EASTERN DIVISION
PORTSMOUTH, GOSPORT AND BOGNOR-REGIS GAS UNDERTAKING
CHEMIST

APPLICATIONS are invited to fill two vacancies on the Chemical Staff of this Undertaking.

Candidates must have had experience of modern gas works plant and processes and be familiar with all routine laboratory tests.

Heavy Oil Catalytic Gasification Plant and Tray Purifiers are now being installed.

The commencing salary will be within Grades APT V and VI £500-£610 per annum on an appropriate step according to experience.

Accommodation is available at a moderate rental if required, and the successful candidates will be required to pass a medical examination and, unless already subject to a Pension Scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme.

Applications stating age, experience and qualifications, giving the names of two Referees, should be received by the undersigned not later than the first post on April 16, 1955.

H. M. LAWRENCE,
Gas Offices, Engineer & General Manager.
The Square,
Portsmouth.
March 21, 1955.

(*Classified advertisements continued on page* 866)

APPOINTMENTS VACANT (*cont.*)

TECHNICAL ASSISTANT required in the Manchester District for work on the development of gas appliances, primarily domestic cookers. The applicant should possess a keen interest in physics and/or chemistry. Continuation of studies will be encouraged.

The salary offered will depend on the qualifications of the applicant. Apply: No. 233, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

THE GAS COUNCIL

APPLICATIONS are invited for the appointment of ASSISTANT INDUSTRIAL GAS OFFICER. Candidates must be qualified fuel technologists and should have practical experience in the application of fuels to industrial processes. Ability to write clear and concise reports essential. Commencing salary of the order of £1,100 a year. The post will be pensionable, and the successful candidate will be required to pass a medical examination.

Applications, giving full particulars of qualifications and experience, should reach the Secretary, The Gas Council, 1, Grosvenor Place, London, S.W.1, not later than April 23, 1955.

NORTHERN GAS BOARD

BLYTH DIVISION

APPLICATIONS are invited for the position of DIVISIONAL GENERAL MANAGER of the Blyth Division at a salary not exceeding £1,700 per annum. The person appointed will be responsible for all Divisional activities to a Management Committee composed mainly of Board Members. The post is superannuable in accordance with the conditions of the Board's Pension Scheme. The commencing salary is dependent upon the qualifications held and the experienced possessed by the applicant. The Divisional Offices are situate at Blythe, Northumberland. The successful candidate may be called upon to pass a medical examination.

Applicants for the post must state age, salary required, give full supporting information and furnish two Testimonials or name two referees to the undersigned not later than Friday, April 22, 1955.

JOHN F. JACKSON,
Secretary to the Board.

30, Grainger Street,
Newcastle-upon-Tyne, 1.

NORTHERN GAS BOARD

WESTERN GROUP—
PENRITH DIVISION
TECHNICAL ASSISTANT
PENRITH WORKS

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT at the Penrith Works.

Candidates should have experience in works control, be prepared to take over control of the works during the absence of the Works Manager, and assist on Distribution matters.

The Salary will be within Grades A.P.T. IV/V of the National Salary Scales for Gas Staffs, depending upon qualifications and experience.

The person appointed may be required to pass a medical examination and will be required to join the Board's Staff Pension Scheme.

Applications, stating age, experience and qualifications, with names of two referees, should be addressed to the Divisional General Manager, Northern Gas Board, 19, King Street, Penrith, Cumberland, to arrive not later than Tuesday, April 12, 1955.

A. R. CROFT,
Group General Manager.

March 17, 1955.

EASTERN GAS BOARD

CAMBRIDGE DIVISION
TECHNICAL ASSISTANT

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT at the Wisbech and/or March undertakings where there are installations of continuous vertical retorts.

The salary will be in accordance with A.P.T. Grade 5, Provincial 'A' (£500 to £580 per annum), the initial placing depending on age and experience.

The successful candidate may be required to pass a medical examination and, unless already subject to a Pension Scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Eastern Gas Board Staff Pension Scheme within six months from taking up the appointment.

Applications giving full details of training, qualifications and experience together with the names of two referees should be sent to the General Manager, Eastern Gas Board (Cambridge Division), 52, Sidney Street, Cambridge, by April 7, 1955.

EASTERN GAS BOARD

TOTTENHAM DIVISION
LABORATORY ASSISTANT/WORKS TESTER—
LEESIDE CHEMICAL WORKS—
TOTTENHAM

APPLICATIONS are invited for the position of LABORATORY ASSISTANT/WORKS TESTER at Leeside Chemical Works.

Applicants who should be not less than 21 years of age, and have reached Inter. B.Sc. standard in chemistry or its equivalent, will be required to undertake duties which include all routine testing and analysis in connection with the Chemical Works and perform Sunday and Bank Holiday duties in accordance with a rota.

The salary will be within Grade A.P.T. 4 (£365-£555) of the National Salary Scales for Gas Staffs according to qualifications and experience.

The successful applicant may be required to pass a medical examination and, unless already subject to a Pension Scheme by virtue of the Gas (Pension Rights) Regulations 1950, will be required, if eligible, to join the Eastern Gas Staff Pension Scheme within six months from taking up the appointment.

Applications, giving age, and details of experience and qualifications, should reach the Divisional Personnel Manager, Eastern Gas Board (Tottenham Division), Woodall House, 658, Lordship Lane, Wood Green, N.22, not later than Saturday, April 2, 1955.

EASTERN GAS BOARD

CAMBRIDGE DIVISION
TECHNICAL ASSISTANT (DISTRIBUTION)

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT (DISTRIBUTION) at the Divisional Chief Office at Cambridge.

Applicants should have had good practical experience of main and service laying and in the operation of a Distribution Department of a medium or large undertaking. They should also possess the Higher Grade Certificate of the Institution of Gas Engineers in Gas Engineering (Supply), or equivalent qualification.

The successful candidate will be required to assist in the preparation of all types of mainlaying projects, including the design of housing estate layouts, feeder and trunk mains and integration mains.

The salary will be within Grade A.P.T. 9, Provincial 'A' (£655 to £755) with placing according to age and experience.

The successful candidate may be required to pass a medical examination and, unless already subject to a Pension Scheme, by virtue of the Gas (Pension Rights) Regulations 1950, will be required, if eligible, to join the Eastern Gas Board Staff Pension Scheme within six months from taking up the appointment.

Applications giving full details of training, qualifications and experience, together with the names of two referees, should be sent to the General Manager, Eastern Gas Board (Cambridge Division), 52, Sidney Street, Cambridge, by April 7, 1955.

HARDMAN & HOLDEN LIMITED require Research Chemist for work on gas purification problems. Age 30-40. Research experience necessary. Salary in accordance with experience and qualifications. Pension and Insurance schemes in operation. Apply Chief Chemist, Manox House, Coleshill Street, Miles Platting, Manchester, 10.

WEST MIDLANDS GAS BOARD

BIRMINGHAM AND DISTRICT DIVISION
SUPERINTENDENT OF BRANCH OFFICE
AND SHOWROOM

APPLICATIONS are invited for the position of BRANCH SUPERINTENDENT of a Showroom and Depot in the Birmingham District, serving approximately 35,000 consumers.

Considerable experience of Showroom Management, Office and Stores Control, Publicity and window display will be required, and candidates must also be able to supervise non-manual and manual staff.

The salary will be within Grade 12 (£790-£915 per annum) of the National Salary Scales.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, personal details, particulars of training, experience and qualifications, together with the names of two referees, should be addressed to Mr. J. E. Wakeford, Divisional General Manager, West Midlands Gas Board, Birmingham and District Division, Gas Offices, Edmund Street, Birmingham, 3, to reach him not later than fifteen days after the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

CIVIL ENGINEERING ASSISTANT

APPLICATIONS are invited for the above position at Board Headquarters, Edgbaston, Birmingham.

The successful candidate will be required to assist in the design and layout of drawings of foundations and structures in reinforced concrete, and also steel frameworks in connection with the installation of new gas plants and other projects. Some practical experience in civil engineering draughtsmanship is essential.

Opportunity will be provided for graduates or holder of the Higher National Certificate to qualify for membership of the Institute of Civil Engineering.

The commencing salary will be not less than £550 per annum.

The post is pensionable, and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with the names of two referees, should be addressed to the Industrial Relations Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham, 15, within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

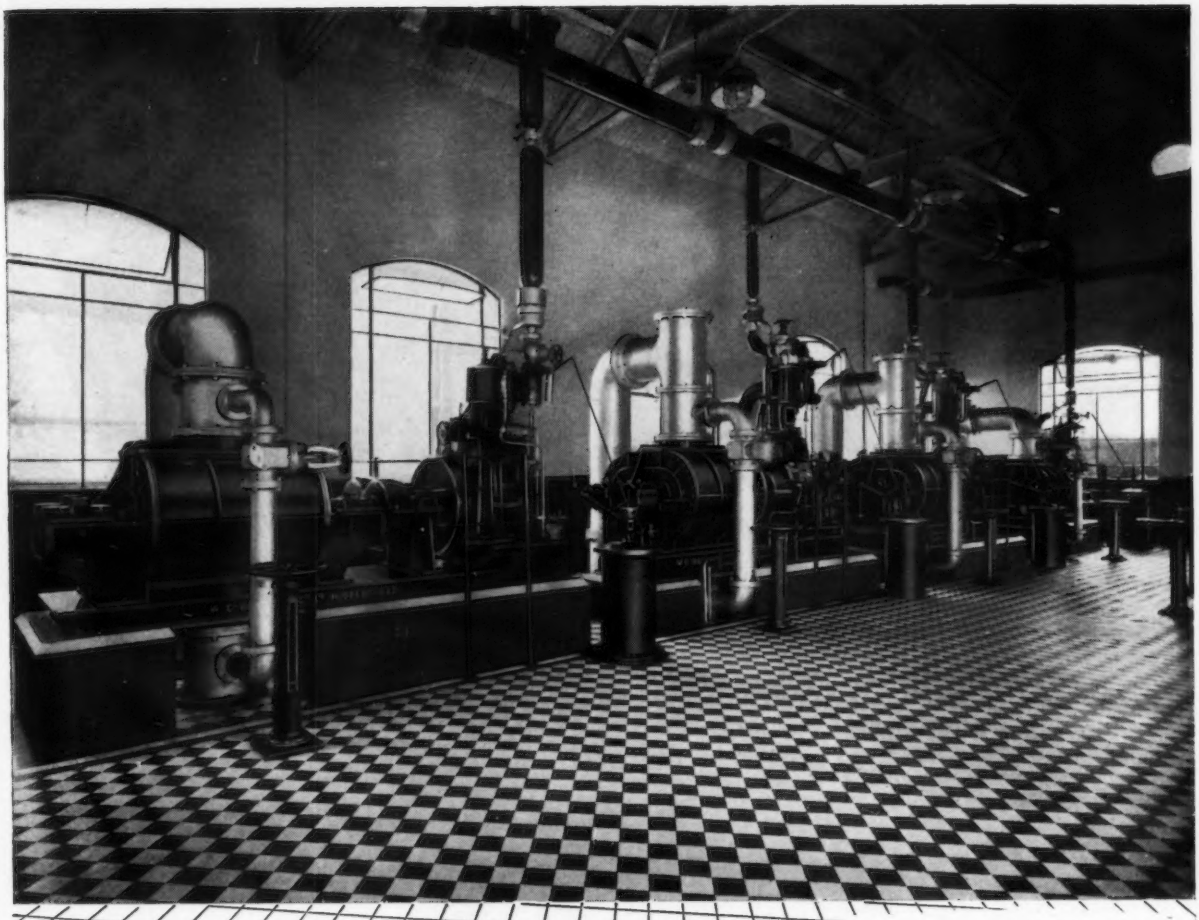
FELLOWSHIP

UNIVERSITY OF SHEFFIELD

COKE RESEARCH FELLOWSHIP of £350 per annum for research in the Department of Fuel Technology and Chemical Engineering. Tenable for one year from October, 1955; renewable for a second year. Open to graduates of British Universities. Full particulars can be obtained from the undersigned to whom applications should be sent not later than June 12, 1955.

A. W. CHAPMAN,
Registrar.

GAS RETORTS
HARRIS & PEARSON LTD
STOURBRIDGE, ENGLAND.
INSULATING BRICKS, RECUPERATOR TUBES, SPECIAL SEMI-SILICA QUALITY FOR SEGMENTAL RETORTS WITH NO EXPANSION OR CONTRACTION AT 1400° C
Manufacturers of
Fire Bricks, Lumps & Tiles
OF EVERY DESCRIPTION



By kind permission of R. L. Greaves, Esq., M.B.E.,
Group General Manager, South Lancashire Group,
North Western Gas Board.

Holmes-Connersville Exhausters at St. Helens

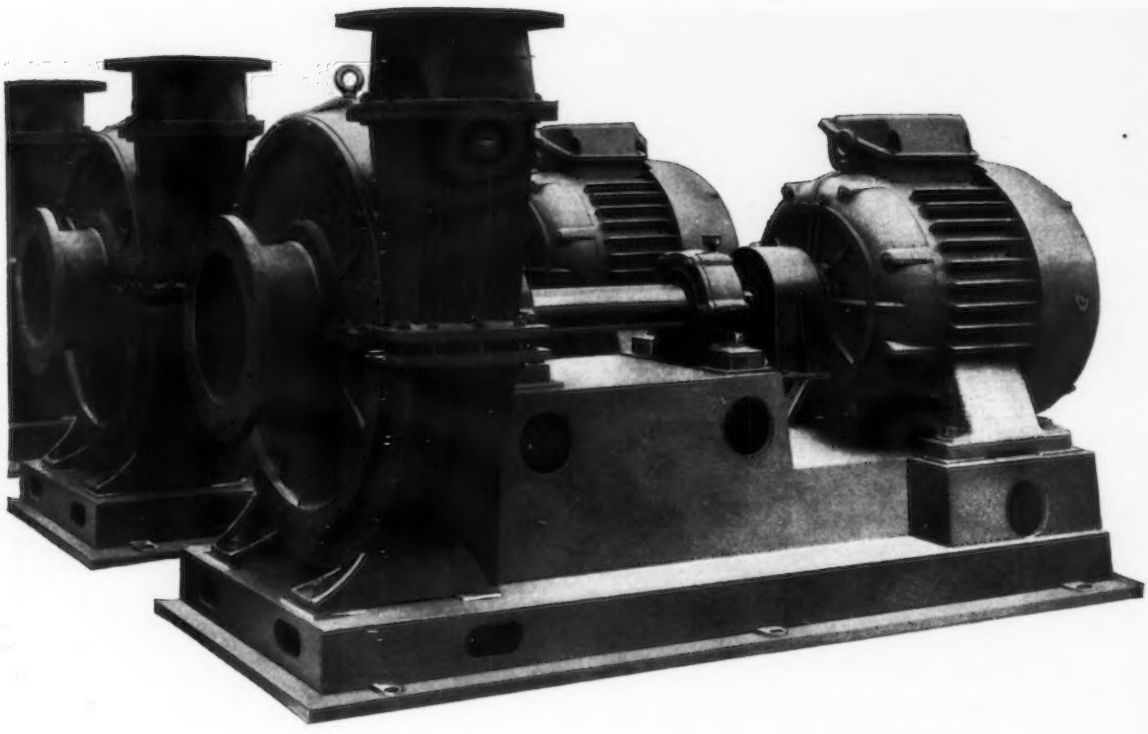
FOUNDED 1850
HOLMES
HUDDERSFIELD

W. C. HOLMES & CO. LTD.

HUDDERSFIELD · LONDON · BIRMINGHAM

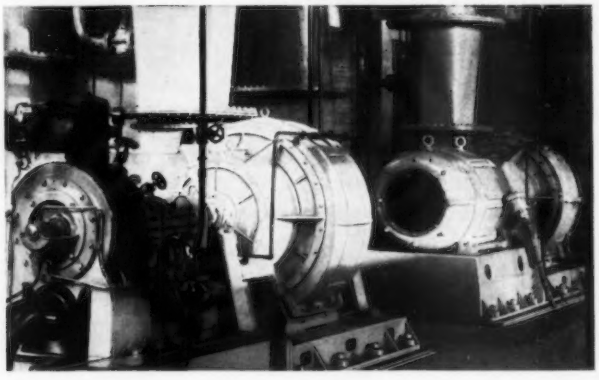
Tel: Huddersfield 5280 London: Victoria 9971 Birmingham: Midland 6830

C 4286



Gas Boosters?

Photo by courtesy of the S. E. Gas Board and Humphreys & Glasgow Ltd.



EXAMPLES of gas boosting fans with cast iron casings are illustrated here. They represent the results of special attention to the design and development of robust, trouble-free boosters over the years. This experience provides fans for handling volumes of 5,000 to 1½ million cubic feet of gas per hour at pressures up to several pounds per square inch.
When the time comes you'll find there's no easier way to solve your air or gas moving problem than to put it to Keith Blackman.

contact **Keith Blackman Ltd**
MILL MEAD ROAD · LONDON · N17 · TOTtenham 4522

T.A.7225/610

Registered as a Newspaper. Printed by STRAKER BROTHERS LTD., E.C.2 for WALTER KING LIMITED, 11, BOLT COURT, FLEET ST., LONDON, E.C.4., Wednesday, March 30, 1955

GLOVER - WEST

CONTINUOUS VERTICAL RETORTS

C.O.L

INTERMITTENT VERTICAL CHAMBERS

WEST'S GAS IMPROVEMENT CO., LTD

ALBION IRONWORKS • MILES PLATTING • MANCHESTER 10
Telephone: COLlyhurst 2961 Telegrams: Stoker, Manchester

AND IN LONDON

Columbia House, Aldwych, S.W.1. Tel: HOLborn 4108 Grams: Wesgasco, Estrand
C.O.L. Division: Chandos House, Buckingham Gate, S.W.1. Tel: ABBey 6912

GC2

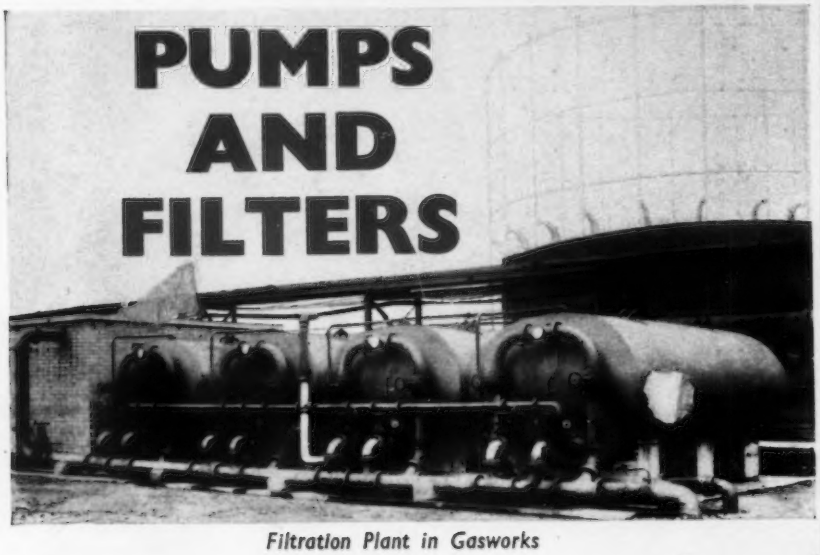
Pulsometer Engineering

IN ASSOCIATION WITH Joseph Evans

NINE ELMS IRONWORKS • READING

CULWELL WORKS • WOLVERHAMPTON

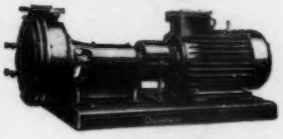
PUMPS AND FILTERS



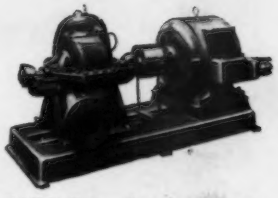
Filtration Plant in Gasworks

The illustrations show centrifugal pumps for light and heavy oil and liquor duties, stoneware and special metal pumps for handling acids and alkalis, pumps for circulating and washer duties, for clean water and fire services and for liquids containing abrasives.

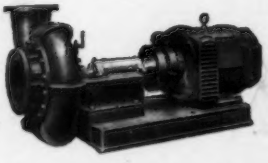
Rotary pump for Oil transfer duties



Stoneware pump for Corrosive and chemicals

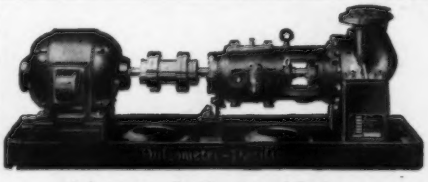


"HS" Type—for water services. All heads up to 500 feet.



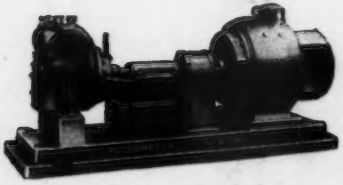
Slurry pump for coal washing and abrasive liquids.

Reciprocating pump of modern design for Gas Works.



Pulsometer—Pacific type, based on latest American practice.

"JA" & "JB" types for high temperature water circulation.



Self priming centrifugal pumps.

LONDON OFFICE:- 39, VICTORIA STREET, WESTMINSTER, S.W.1.

BRANCHES:- BIRMINGHAM · CARDIFF · GLASGOW · LEEDS · MANCHESTER · NEWCASTLE - ON - TYNE

1955